TECHNOLOGY DEPT.

Gas Journal

Vol. 265. 103rd Year. LONDON, JANUARY 31, 1951. No. 4574. Price 1/-

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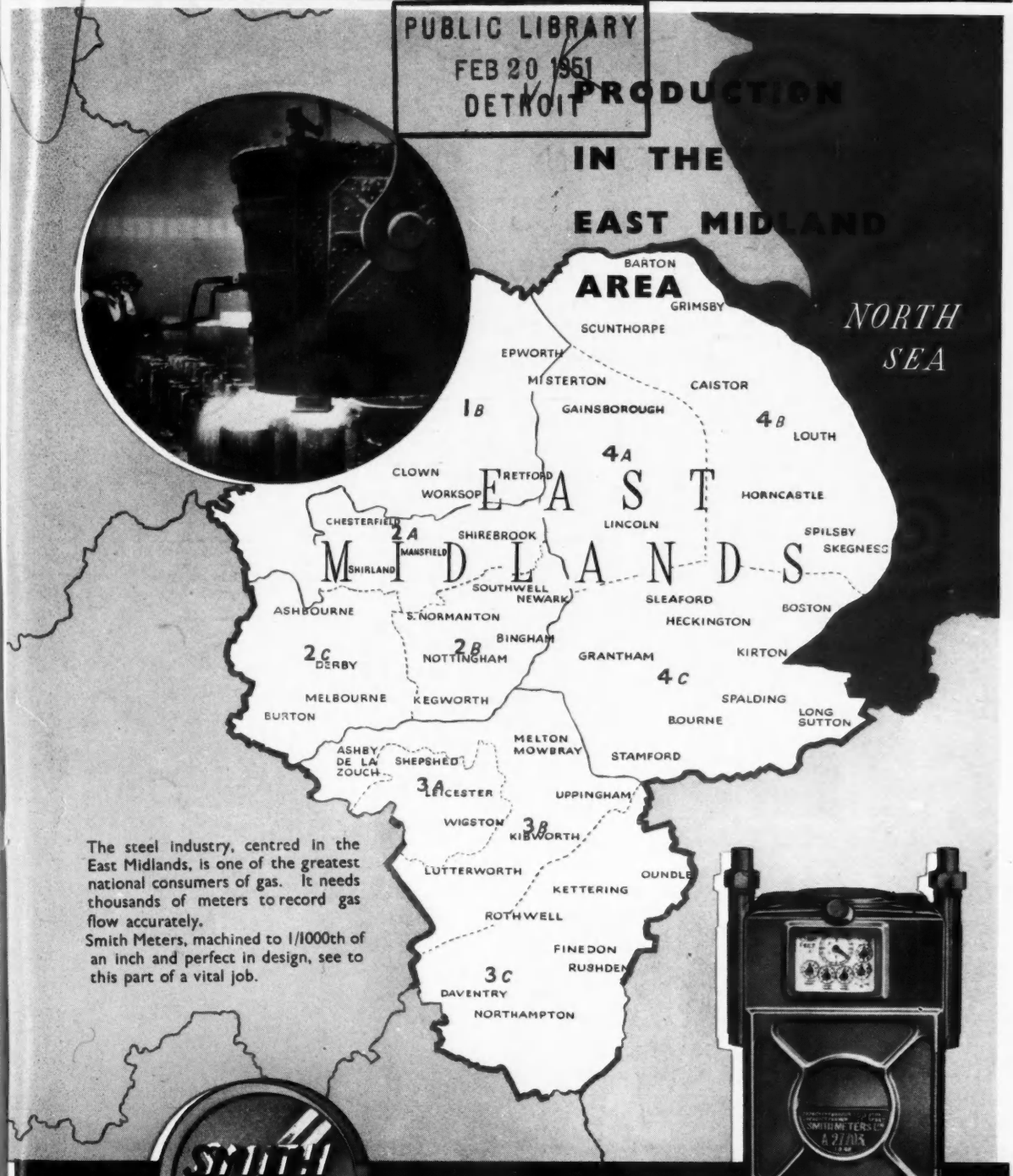
DETROIT

PRODUCTION IN THE EAST MIDLAND AREA



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Smith Meters, machined to 1/1000th of an inch and perfect in design, see to this part of a vital job.

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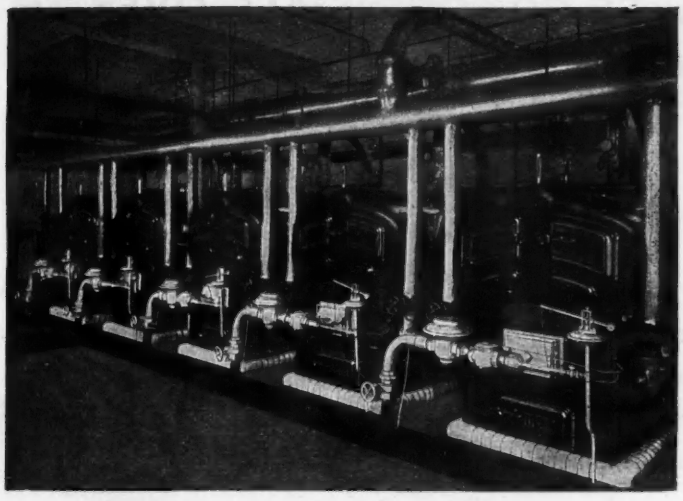

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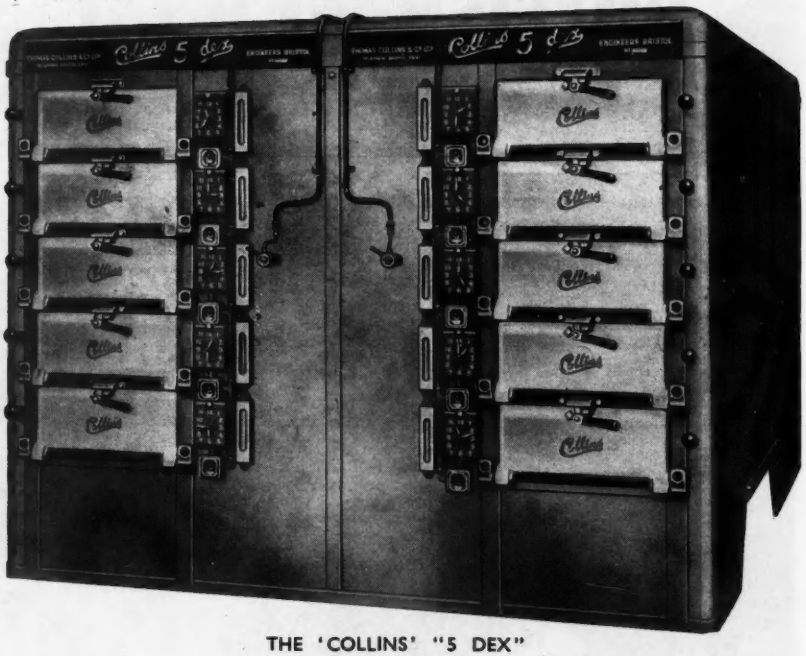

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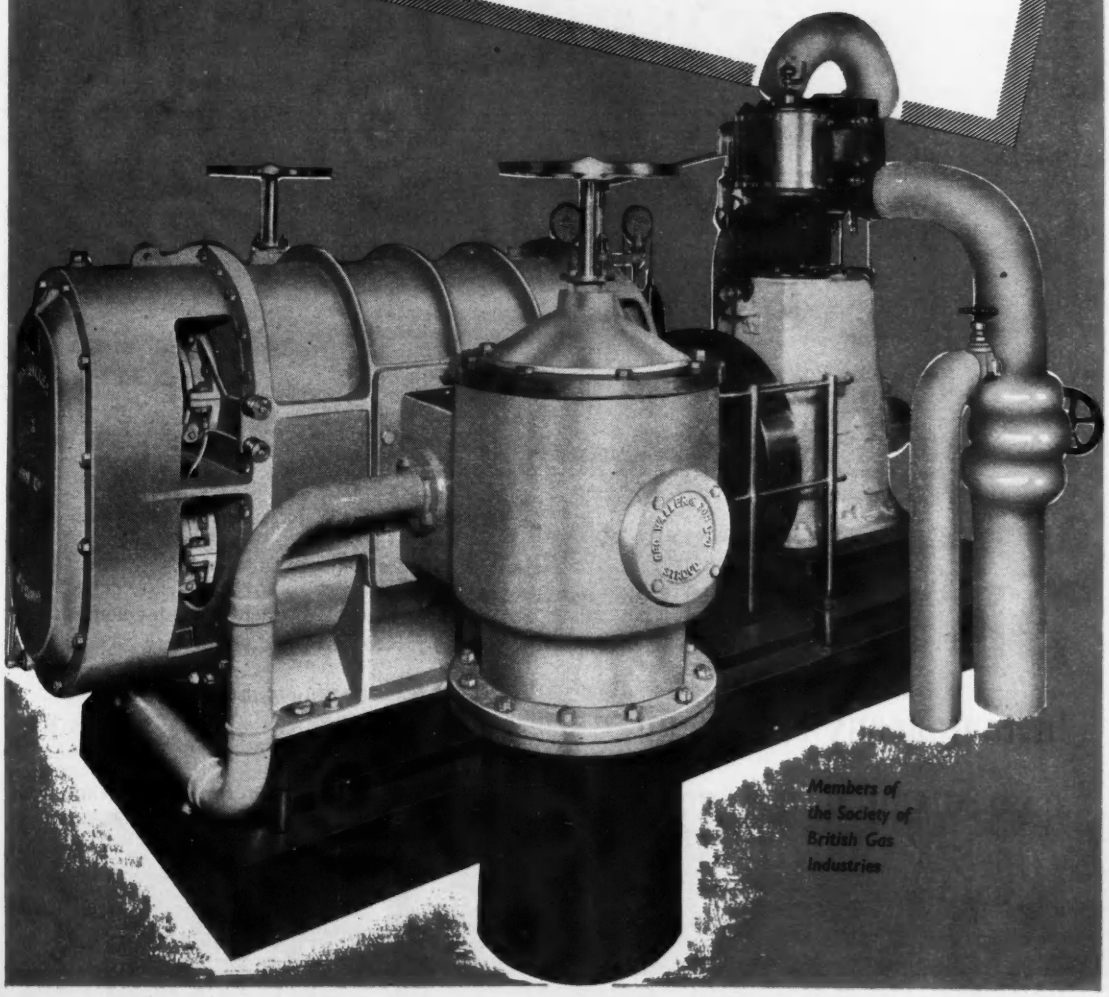

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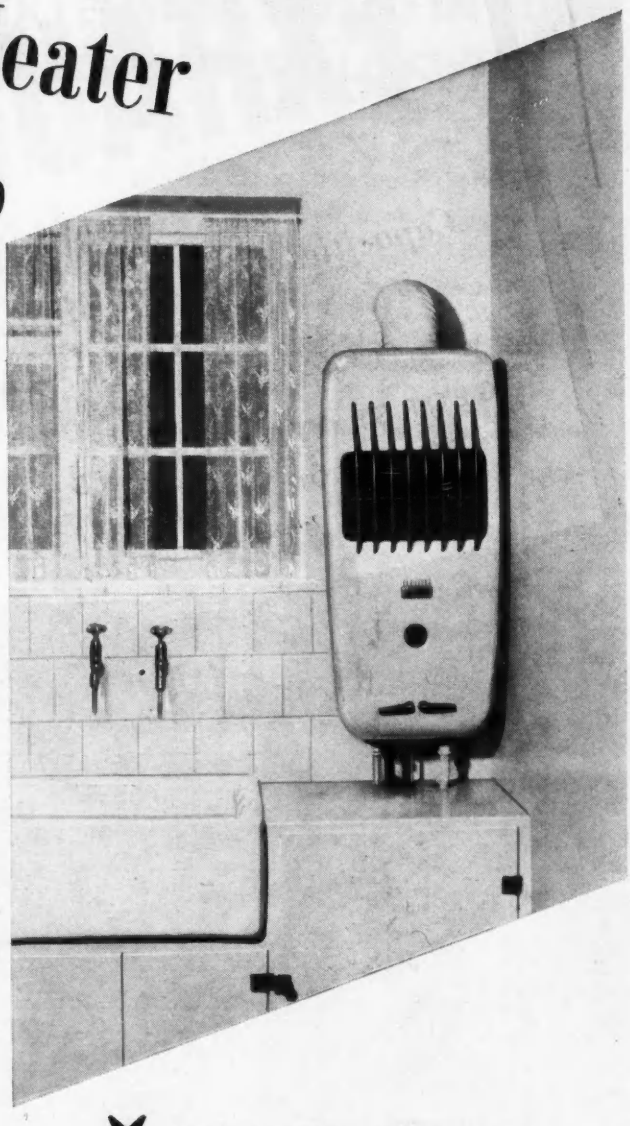

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- Models available for cistern or mains supply.
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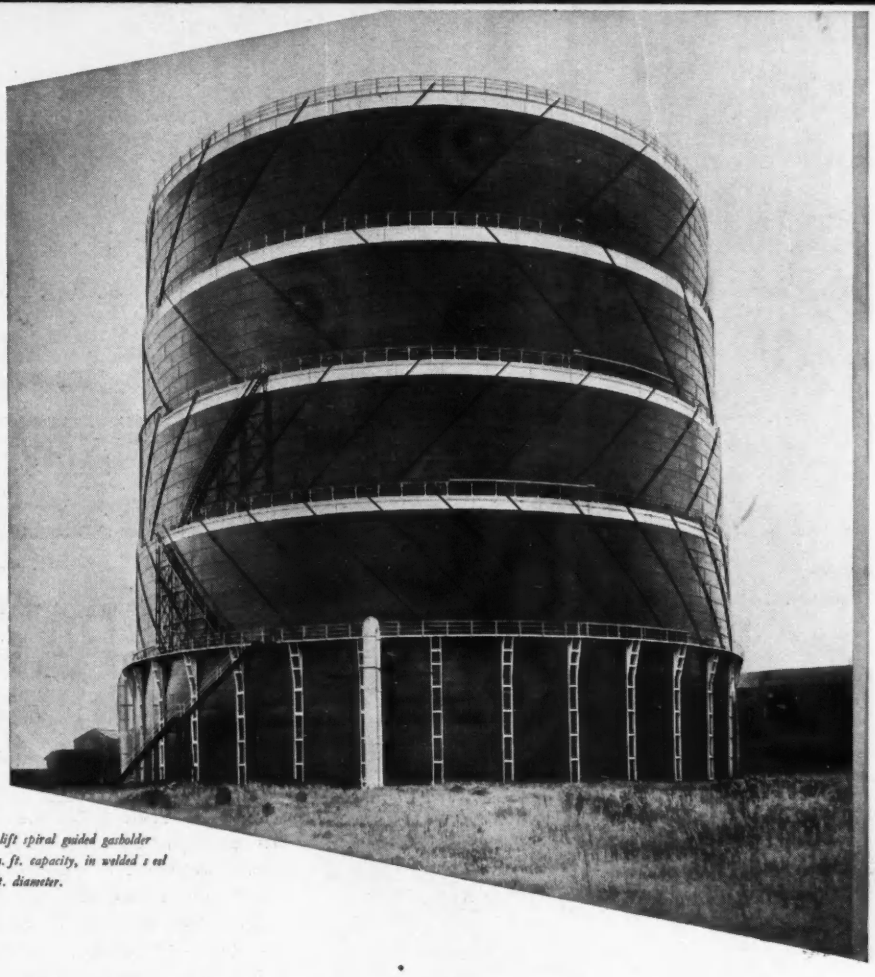

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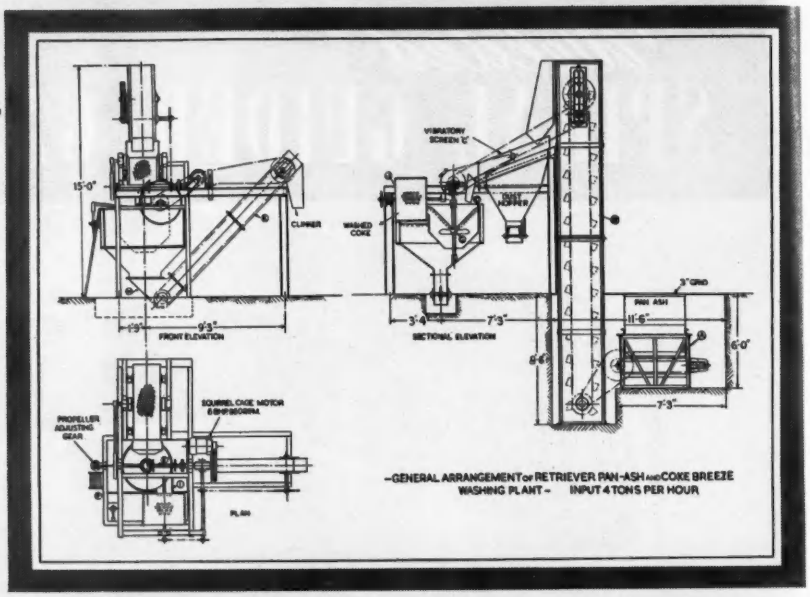

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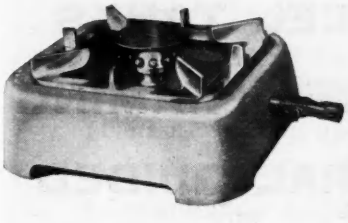

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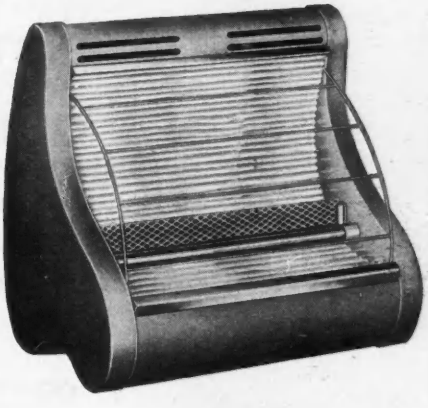

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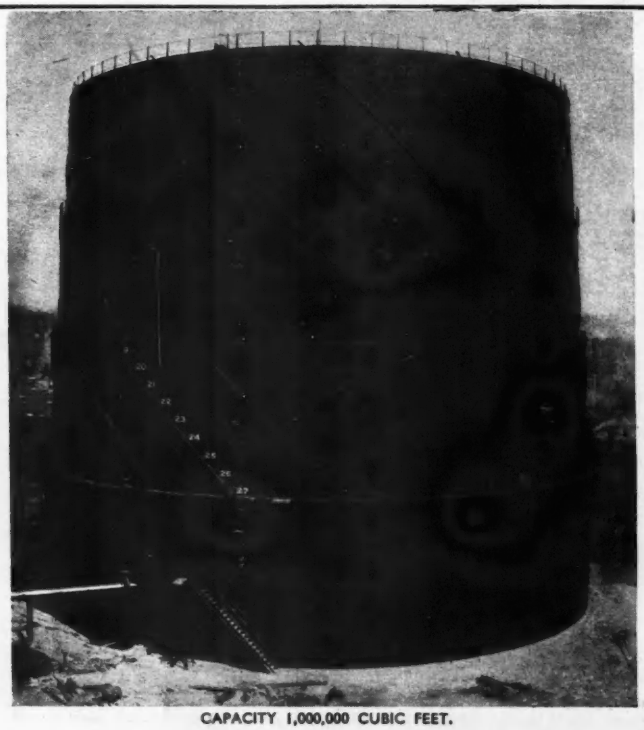

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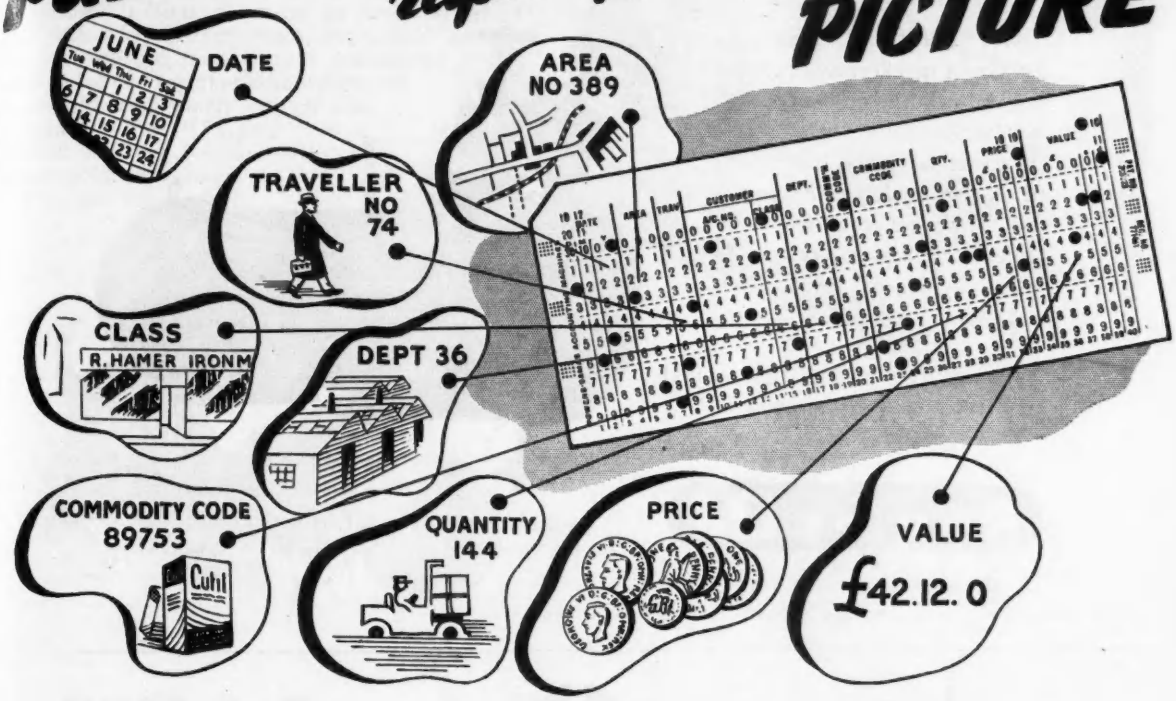

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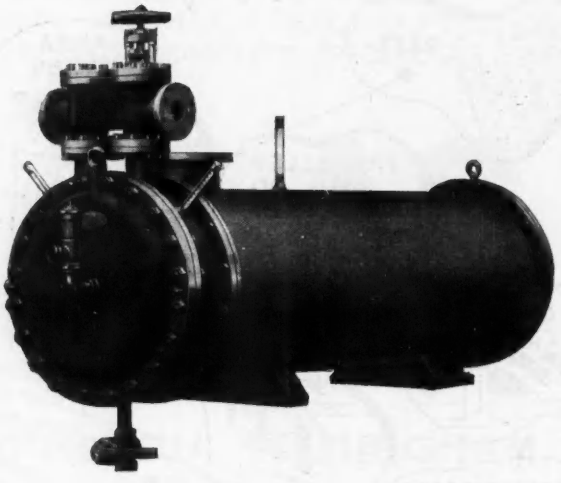

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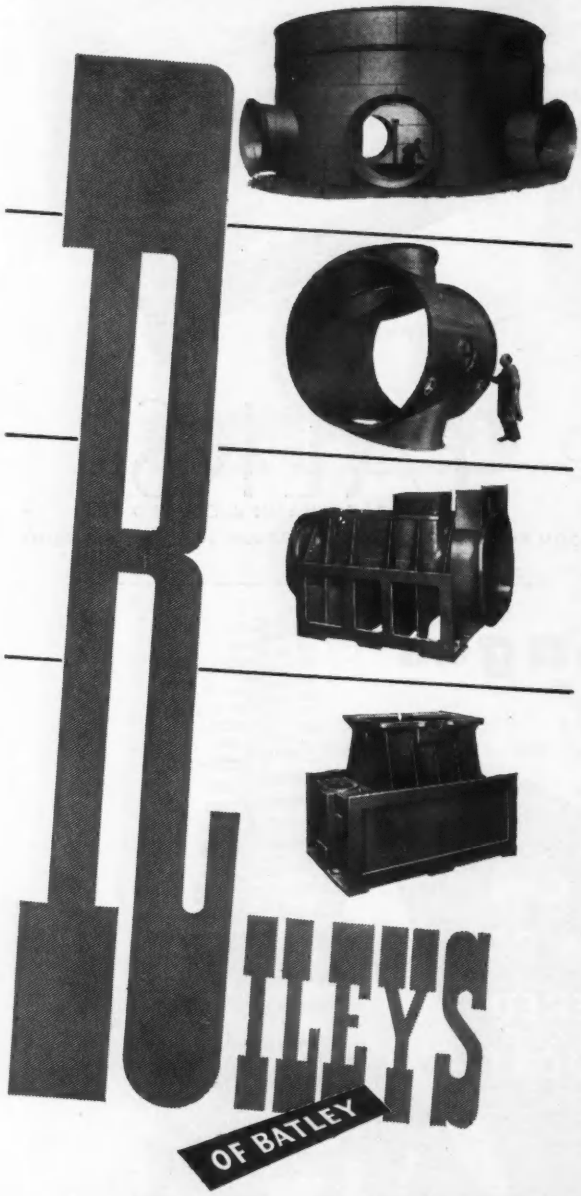

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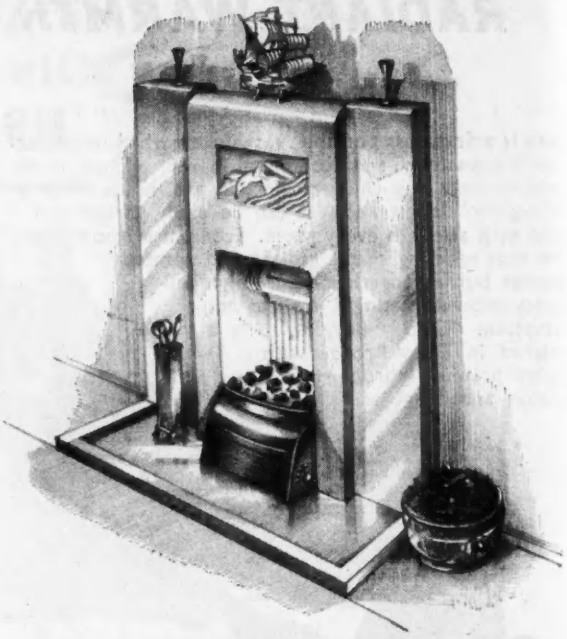

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Comfort —
made possible by an open coke fire which will burn all night and give a constant flow of warmth in the room.

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by eliminating the drudgery of lighting fires on cold mornings and providing hot water in abundance.

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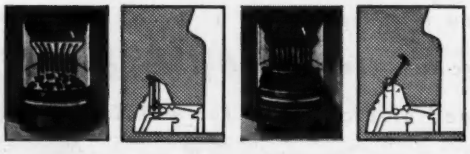

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and it is really mobile—a Mammoth has been towed 200 miles in 12 hours—proof of its roadworthiness.

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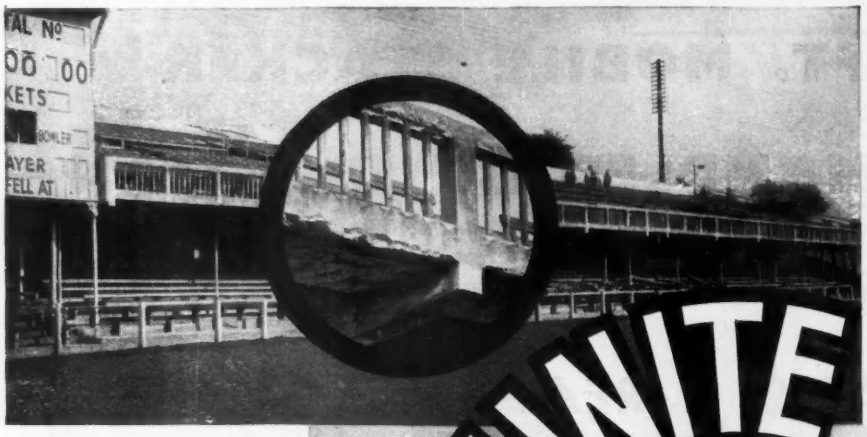
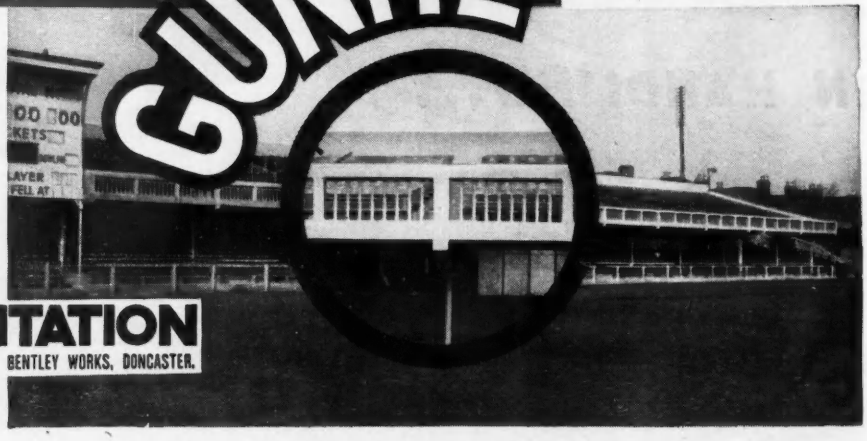


GUNITE REPAIRS to the Grandstand at 'Trent Bridge.' Before and after treatment.

Estimates given for encasing structural steelwork and covering the wearing surface of chutes and bunkers.

GUNITE



Photographs by kind permission of the Nottinghamshire County Cricket Club, and Messrs. Sutton & Pearce, Chartered Architects and Surveyors 15, Clarendon Street, Nottingham.

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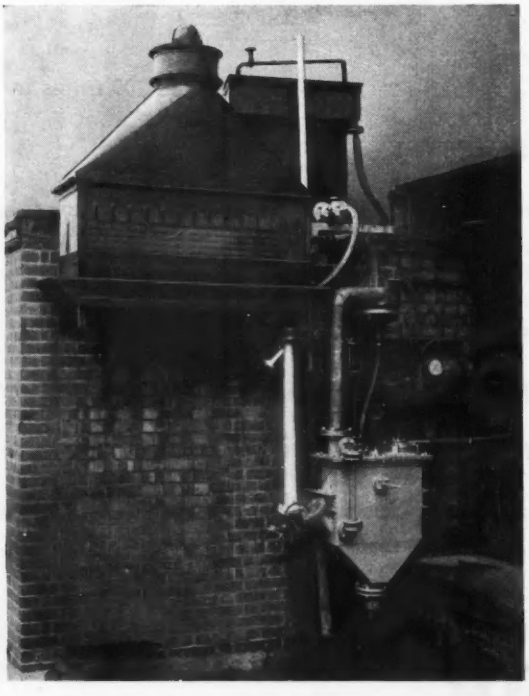

SPENT PICKLE RECOVERY PLANT

Illustration shows a Pilot Plant for evaporation of spent pickle from strip mills for the continuous recovery of free acid and monosulphate of iron by use of Swindin Patent Submerged Burner and Patent Pre-evaporator. Factor of performance 1·3. Can be seen in operation any time on application to :—

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NO GAS ENGINEER can doubt that precision die-casting and machining to tolerances of 2/1000ths of an inch are superior to " tin and solder " methods of fabrication ; or that corrosion-resisting light alloys are stronger and better than older materials. Modern methods and materials have produced a robust and remarkably accurate meter that is badged at 200 cu. ft./hr. without exceeding D.1 case dimensions.

BEGWACO METERS

Precision built in die-cast corrosion-resisting light alloy.

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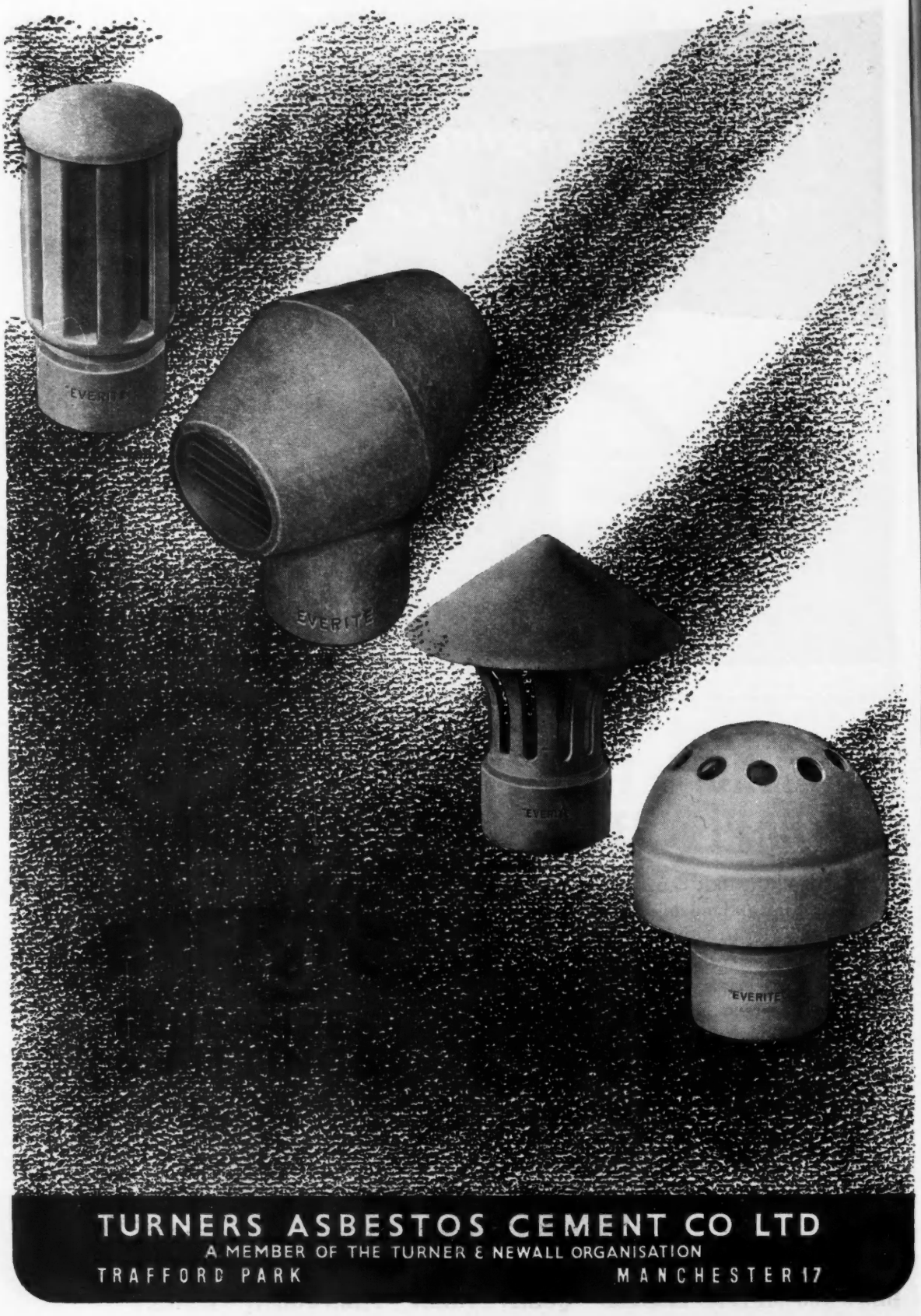

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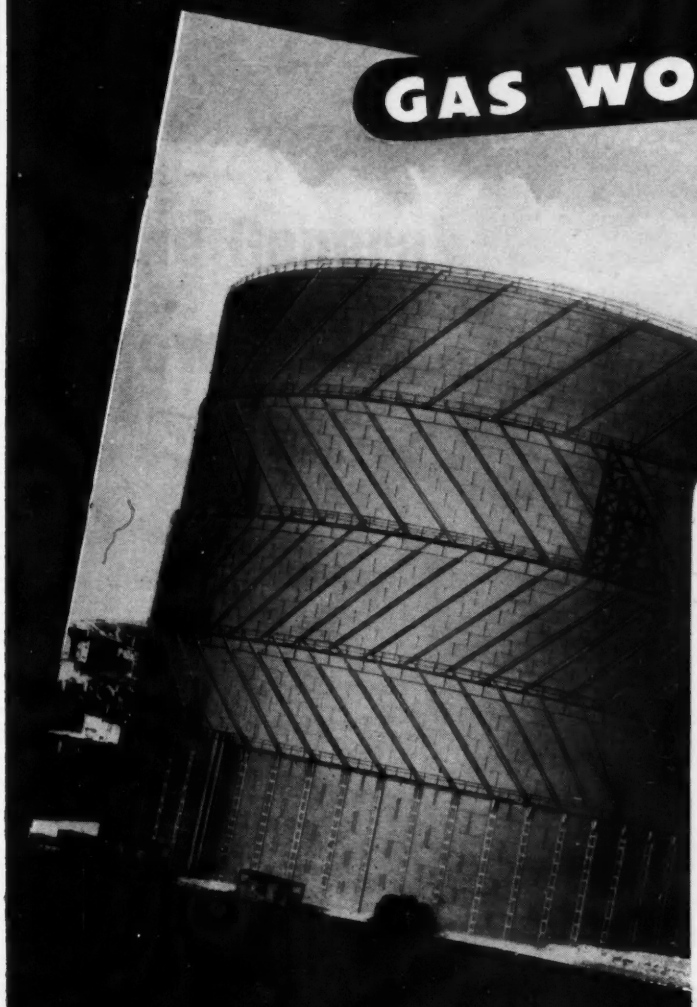
GAS WORKS PLANT



We have been wellknown for many generations as designers and manufacturers of gasholders and other gasworks plant. The 4-lift spiral gasholder illustrated is one of 8-million cu: ft. capacity and is the largest spiral gasholder in a steel tank in the world. This was designed and constructed by us several years ago and suffice it to say we have recently received a repeat order. We shall be glad to consult with you in regard to your own problems.

YOU WILL REMEMBER
young **FRANK WARD**

who we have introduced to you earlier as one of our many Craft Apprentices. He is making good progress through our Constructional Training Centre so that with the experience thereby gained he may be the better able to assist us in providing that standard of craftmanship in structural engineering which is our aim at all times and which we believe to be YOUR SAFEGUARD FOR THE FUTURE.

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Controlled by The Staveley Coal & Iron Co. Ltd.

Look what weve done
to please the ladies even more

The General C27/16 Gas Cooker now has *2 new* selling features

★ "As you see, there are no nuts or bolts to bother with . . . the hotplate lifts up, can be turned right round and dropped back in position." ★

★ "The other big advantage of this cooker is that these trivets lift out easily and can be dropped back in *any* position." ★

BY ALWAYS keeping ahead in gas-appliance design, General Gas make sure that their products — for efficient, labour-saving service as well as smart, modern good looks — are always ahead in public favour. This announcement is another instance of leadership in design that is sure to mean leadership in sales.

All these features, too, make it a fast seller

Black or Blonde Hotplate — Black is fixed, blonde hotplate is now reversible for even wear.

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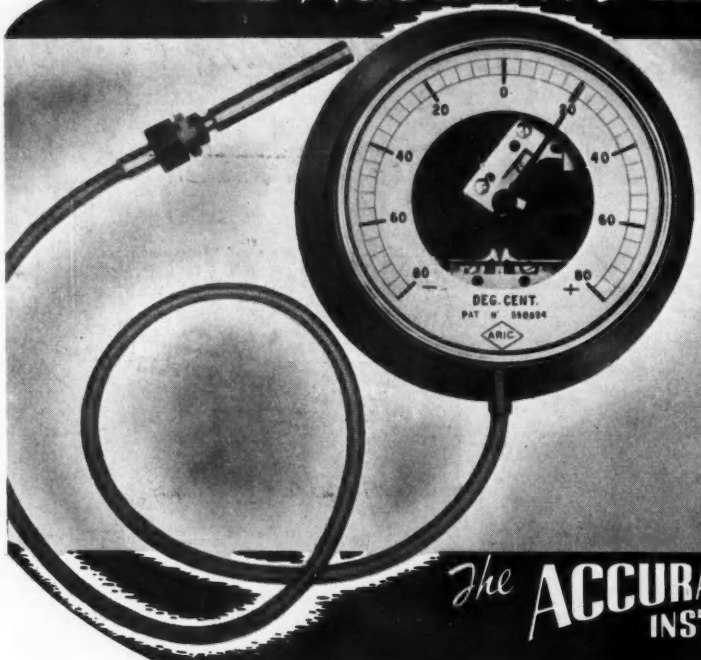

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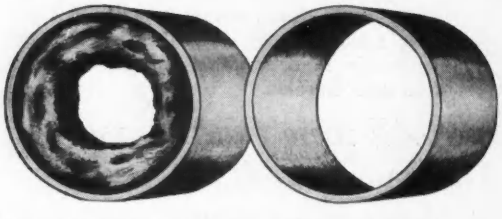

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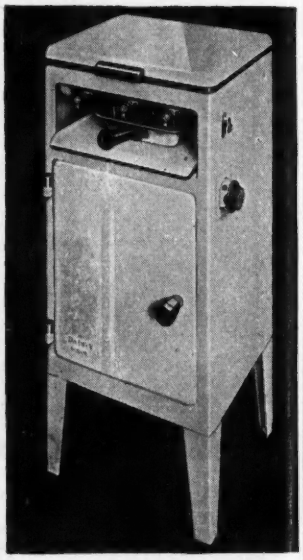

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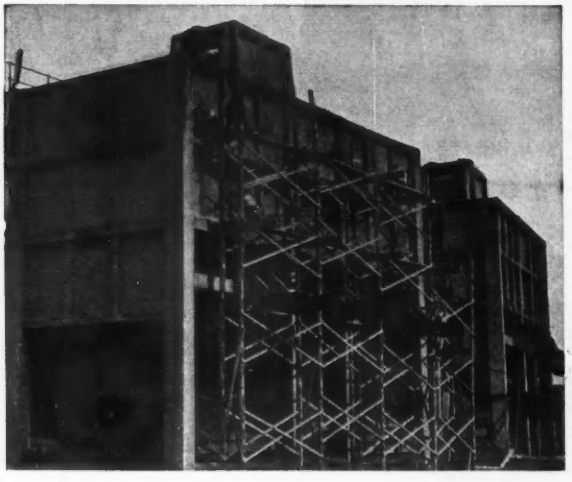

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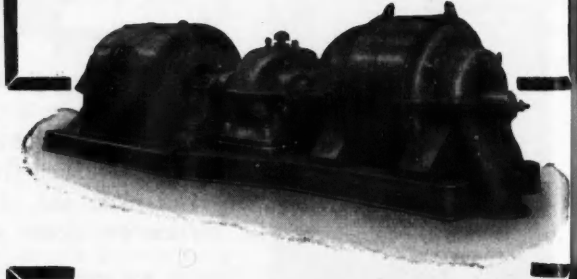

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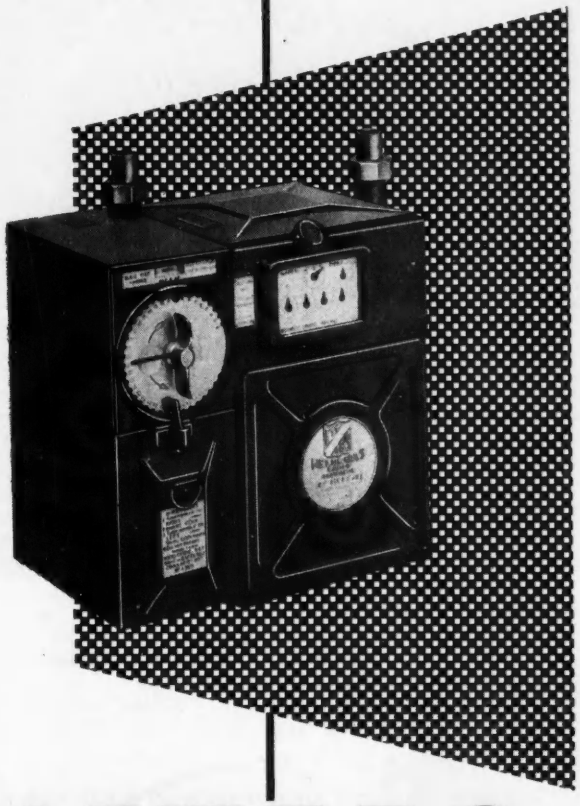

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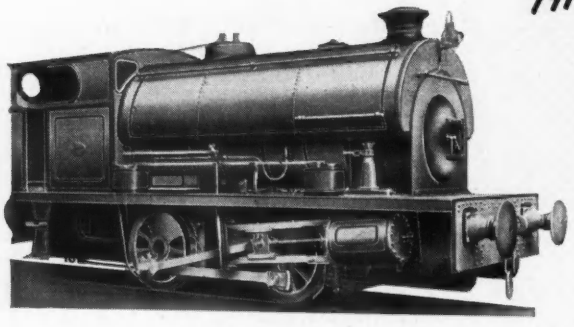

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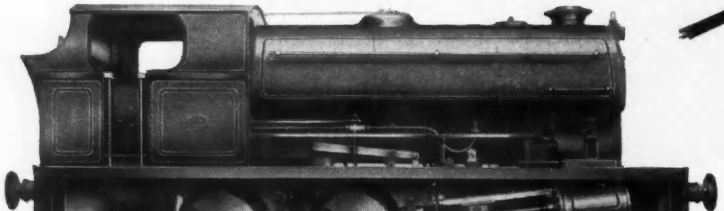

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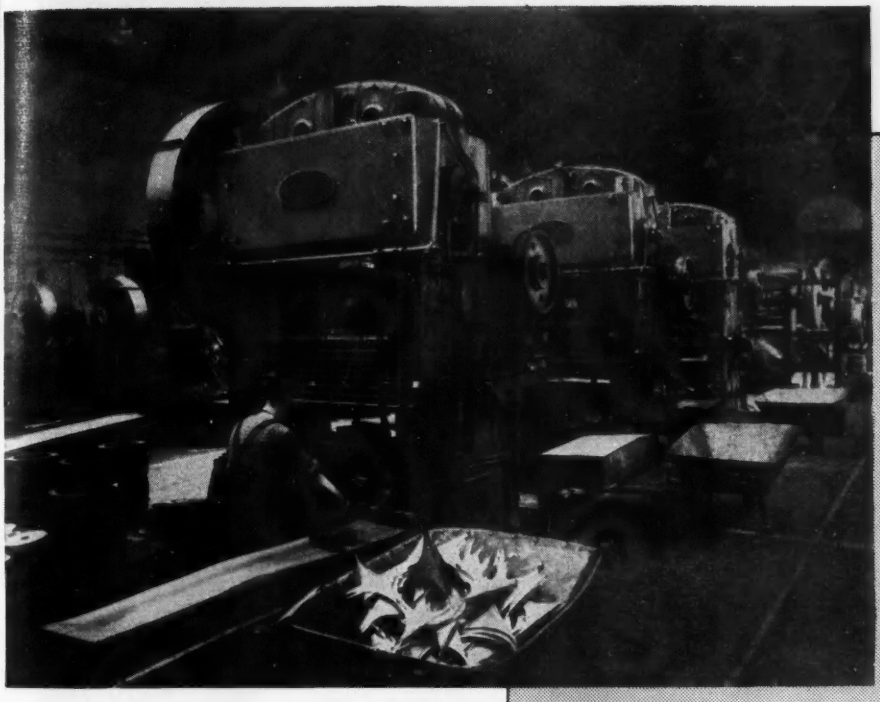
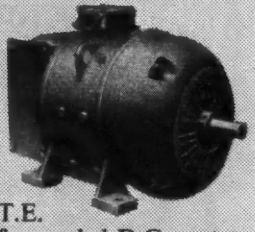


A.C. squirrel-cage induction motor (die-cast frame)



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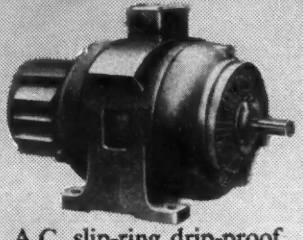
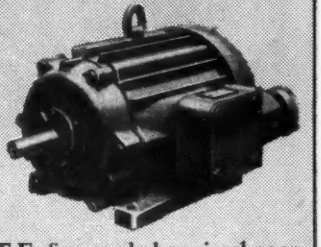


A.C. slip-ring drip-proof motor.



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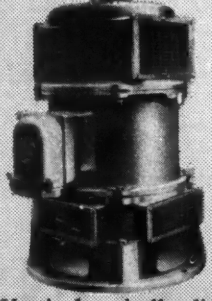

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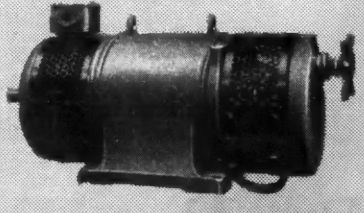

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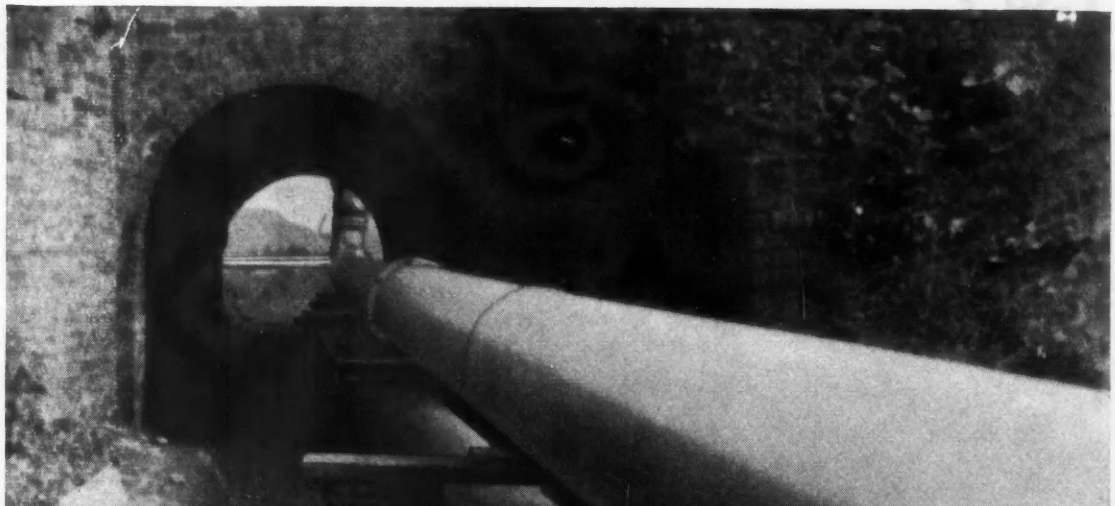

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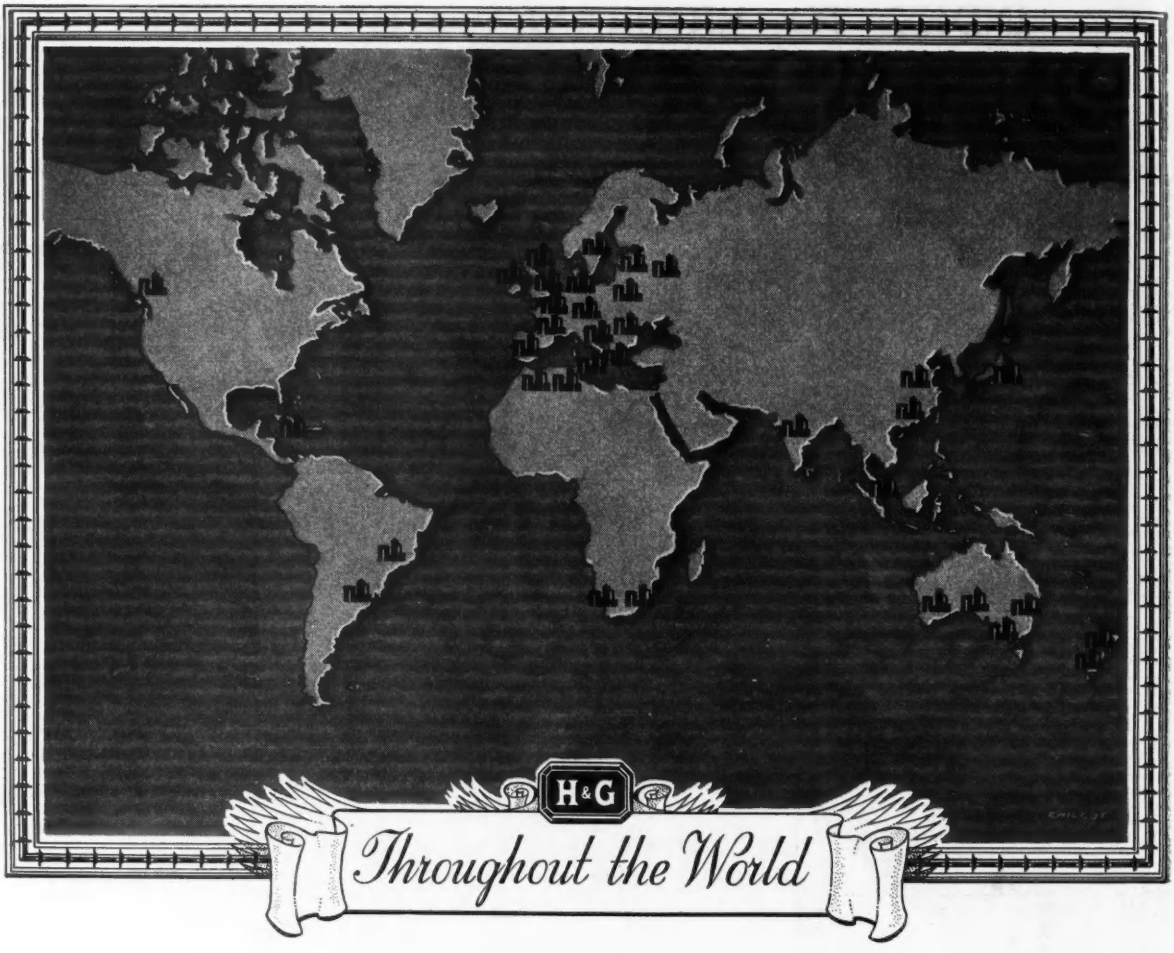

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Gas Journal

103rd YEAR OF PUBLICATION

EDITOR: NORMAN S. SMITH, B.Sc.(Gas Eng.)

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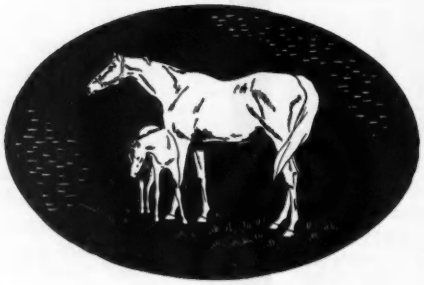

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GAS JOURNAL

VOL. 265. No. 4574 103RD YEAR JANUARY 31, 1951

CONTINUOUS VERTICALS

THE North Thames Gas Board is keeping up the incomparable tradition of service to the gas industry which was characteristic of its great predecessor, the Gas Light and Coke Company. Mr. Lewis's intensive study of results obtained with one system, of continuous carbonisation in vertical retorts, the Woodall-Duckham, in the production of gas at 500 B.Th.U./cu.ft., or a little over, with two classes of coal, Yorkshire and Durham, is a signal contribution to the corpus of accurate data which some will date from Dr. Pexton's great work in this field. The paper, given to the London and Southern Junior Gas Association, was published in the *Journal* last week. Our report of the discussion will appear in a later issue.

The reduction of all the results to the common basis of the equivalent performance when making gas at 500 B.Th.U./cu.ft. with coals containing a standard proportion of inerts, 8% of ash plus moisture, is shown to permit a very convenient comparison of results at other calorific values and with coals of different composition in this respect. Comparison of results per unit capacity of retorts of different sizes is more difficult. Comparison on the basis of therms produced per inch of major axis is not entirely satisfactory ; it takes no account of differing minor axes and different tapers. But the influence of these factors tends to become such that the comparison may serve for some inferences, if these are not carried too far, and if its shortcomings are kept constantly in mind.

In 1938, we are told, the designers and users of these retorts became aware of the problem of retort size and shape. The large retort was seen to be at a disadvantage compared with the smaller retort. If we attempt to use, in the data here given, the criterion, therms per inch of a major axis, we find, unfortunately, that we have no comparable data between, say, the 80 in. and the 103 in. retorts with the same coal. The nearest we can get is that between the twin 44 in. retorts at Kensal Green and the 103 in. retorts. And here the comparison seems to be ever so slightly against the smaller unit. (The twin retort was more successful with Yorkshire coals.) This unexpected result (unexpected, that is, by us) is explained by the difficulty experienced in keeping the twin charges moving equally ; 'the common gas offtake system makes for difficulty if one of the 44 in. retorts hangs up.' Segregation of coal in the bunkers causes differences in the grading of the coal reaching each of the two twins with consequent differences in working. On the other hand, the considerable improvements accruing from developments in the system of heating and from the adoption of (or return to) the continuous taper are clearly apparent.

We are not sure that we follow the argument about the length of the coal core in relation to throughput. It would be a pity if this were taken as support to the view held in some quarters that there is merit in working with a high throughput irrespective of the other factors which determine it. The coal core will be low in the retort, as Mr. Lewis clearly points out, because when making gas at such values as 525 B.Th.U./cu.ft., even with Durham coals, there is little steaming. To keep up the therms production per retort this must be so, since this figure is the product of therms per ton by throughput in tons. If steam input be increased, as it would need to be to make more therms *per ton* by the addition of water gas, there would need to be not only additional heat (over that provided by the residual heat of the coke) delivered from the combustion chambers, but also more hot coke available in the lower zones of the retort. The throughput would be reduced (with the result that the coal core would be shorter), but the therms produced *per retort* albeit at a lower calorific value, might even be increased, to a certain optimum value at a particular calorific value. None of the data in this paper throws any light (nor is this intended) on what these optima might be with either of the classes of coal used.

The remarkable thermal efficiency of the continuous vertical, upon which Dr. Pexton has so forcefully remarked, is, however, fully brought out by this data. The wisdom of dispensing with recuperation, as practised in other systems, is fully justified. Recovery of heat by transferring the residual heat of the cokes to the secondary air, coupled with effective insulation of the settings, is seen to result in a satisfactorily low fuel consumption. 'It seems unlikely that any material reduction in fuel consumption will be attained by additional insulation or preheating of secondary

air.' But it is to be hoped that attempts will be made to apply Dr. Pexton's suggestion of preheating primary air by heat exchange with the coke, even though the recent introductions of the mechanical producer are rendering this less attractive. And the possibilities of a metallic recuperator or heat-interchanger in the waste gas flues call for further exploration. Dr. Pexton's dictum still remains true: 'Although the overall fuel economy is so favourable, this system' (the continuous vertical retort) 'probably offers the greatest scope for improvement.'

SUPPLY UNDER DIFFICULTIES

CANNOCK, the centre of the Chase mining area, cannot be described as beautiful, but it is certainly an extremely important one, with about a couple of dozen collieries scattered about the surrounding district. The approach roads to the town show ripples and cracks; kerbs are distorted; warning notices concerning the danger of subsidence crop up like mushrooms. On occasion the carriage-way collapses leaving holes large enough to take a horse and cart. In one district a matter of 14 houses all using gas sank 12 ft.; water is at the level of what would have been the bedroom windows. 'Every service buried in the road, whether it is water, gas, electric, sewer, or telephone cable, is liable to damage. The houses bordering the road lean drunkenly forwards and others backwards; doors and windows become fixed; ceilings crack and fall down.' We quote from a paper which Mr. F. C. Hawkyard gave recently to the Midland Junior Gas Association and which we publish on later pages of our issue today. Other districts, we know, suffer damage in varying degrees from the same cause. The whole is a most unpleasant background for gas distribution.

What impresses us about Mr. Hawkyard's modest paper is the constant vigilance exercised by the gas undertaking to ensure safety and continuity of service. The odds are great, and when one difficulty or a series of difficulties has been overcome, further difficulties—like the spread of a slow disease—arise. Gas distribution in the Cannock area calls for prophecy. A record of all incidents, fractures, and so on, is plotted on a 6 in. to the mile Ordnance, and when each year is completed the map is photographed and serves as a record for future information. 'It can be seen at a glance which are the areas affected and the map can be read to forecast the direction and particular position in which we can expect future damage.' And, of course, the peculiar circumstances call for the greatest measure of co-operation between all the public supply services, and more especially, perhaps, between gas and water supply. The experiences at Cannock call to mind the incidence of bomb damage during the last war, when one of the major problems in the immediate stages was the pumping of water from fractured gas mains. Cannock, in fact, engages in what might be regarded as a minor war—and there is no cessation of hostilities. The undertaking deserves praise for its R.P. (Repair Precautions).

There is one other aspect we would mention. Up to the present the Cannock undertaking has never received any compensation for damage sustained to any part of the distribution system or for the loss of gas through leakage. Mr. Hawkyard feels there are grounds for hope in the future through the recommendations contained in the report of the Turner Committee, but is of opinion that one of the main benefits of that report should lie in the closer collaboration between the National Coal Board and the West Midlands Gas Board, of which Cannock is a component unit. Such collaboration is a necessity rather than a desirability.

IF THE CAP FITS

ONE of the results of nationalisation is the ignominious end of the happy-go-lucky gas undertaking. By this we mean the undertaking, usually small, which has operated for years with carefree inefficiency. Despite lack of planning and a cheerful indifference to the refinements of the scientifically guided works, such undertakings—and we would emphasise that we are not suggesting that size is alone a criterion of efficiency; there have been and there remain many small undertakings both small and efficient—functioned year in year out, and more often than not at a profit. Out-dated plant, muddled direction, and a complete absence of sales outlook was not sufficient to prevent perhaps a hundred years of commercial success. The reason was twofold: The possession of a readily saleable commodity and the lack of serious competition; and the establishment of a price sufficiently high to cover production. Today conditions are very different. Competition of the most formidable nature is rampant, and the revision of prices throughout the areas has focused an embarrassing light on excessively high prices. The establishment of a uniform or near uniform price has necessitated the reformation of these old works. If they cannot operate more economically, their existence is imperilled.

This means that, for the first time, modern methods are being applied. Engineering and managing practice usually only found in large works is being introduced for the first time to smaller, backward works. The transition is not easy. For the engineer in charge it tends to go against the grain. He regards with mistrust methods involving increased 'paper work;' how can mere schedules and indexes materially improve a gas service which has made and paid its way for years? A partial answer is contained in a paper by Mr. L. W. Jarrett, 'Efficiency and Maintenance on a Gasworks,' presented to the Eastern Juniors on January 19.

The methods outlined are by no means original, but the description of their basic points is timely. The author gave no indication that his suggestions were intended for the small works, but they could hardly have been meant for large ones, most of which not only employ the methods advocated, but employ them in a more highly developed form. It is wisest to regard them as a series of suggestions for the small or medium-sized works. To many they will appear somewhat obvious, but we have no doubt that there are numerous works, notably in semi-rural areas, where they might be adopted with advantage.

The paper deals with the preparation of a yearly production chart, the correct use of mechanical handling plant, improved promotional opportunities for gas staff, and several other topics. Of these the subject which aroused most interest in the ensuing discussion was the compilation

of plant records and the operation of an efficient maintenance service. Although there will no doubt be some disagreement with the details of such a scheme as is outlined in the paper, few are likely to query the logic of the basic idea; this is the briar on which must be grafted the needs of the individual and which, it is hoped, may ultimately produce a few roses. If the author is somewhat dogmatic, at least he makes his point. For the reader it is a case of 'If the cap fits . . . .'

EFFICIENT HOUSE HEATING

A HAMPSHIRE heating engineer described in a recent letter to the *Financial Times* his own method of house heating which he claimed to be the most efficient from the consumers' and the national point of view. He has a domestic boiler rated at 45,000 B.Th.U. with an efficiency of over 76% (official test figures), which provides all the hot water for a family of four, including four baths per day and the use of a washing machine. In addition the boiler heats three radiators which are used for 'background' heating and to take the chill off the fully-insulated house. Steel panel hot water radiators are fitted under the windows. The boiler flue is inside the house, its four walls heating the bathroom, cloak room, airing cupboard, and kitchen respectively. In addition, the cold feed tanks are arranged round the chimney in the loft so that the possibility of freezing is reduced to a minimum. The house is always warm, and the temperature, without any topping up, is around 50°F. with doors and windows closed. Labour is reduced to a minimum because the boiler harmonises with the sink unit, and the ash container requires emptying only once a week. The ash contained in the writer's continuous-burning open fire requires emptying twice a week. Fuel consumption on this appliance has been reduced to 15 lb. per 24 hours, and the fuel consumption on the domestic boiler can be kept within 18-20 lb. per 24 hours.

The main point of the letter, however, was that there is a place for gas, a place for electricity, and a place for solid fuel, and that the best way to ensure maximum fuel efficiency is to use a combination of all three fuels. In this country we are not accustomed to living in reasonably warm homes, entirely due to the fact that we look to a single source for our heat, and it is quite impossible to expect any single appliance to heat the whole house or even one room effectively if the room happens to be a large one. The answer, the correspondent contends, must be a greater development in the use of central heating, though this need not be, of necessity, complete. All that is required is enough to take the chill off and keep the walls of the house reasonably warm.

THE FUEL CRISIS

THAT the imminence of a serious fuel crisis has in no way receded was made abundantly clear in a statement made last week by Mr. Alfred Robens, Parliamentary Secretary to the Ministry of Fuel and Power. Indeed, it seems likely that only exceedingly mild weather during the next two months can avert a shortage which may throw many people out of work with resulting substantial loss of production. This is tantamount to an admission that there is little expectation of achieving the extra 3 mill. tons of coal for which the Prime Minister appealed to the miners a few weeks ago. The rise in inland consumption of coal in 1950 as compared with 1949 occurred in all the main consumption groups except the railways. Electricity took nearly 2.9 mill. tons more, gasworks and coke ovens about 900,000 tons more, industrial consumers about 1.8 mill. tons more, and domestic users about 1.6 mill. tons more. Increased production did not keep pace with the rise in consumption, and the effect was that distributed stocks at the end of last year were some 2.3 mill. tons less than at the end of 1949. This figure of distributed stocks is the key to the national fuel situation, reflecting as it does changes in the levels of production and consumption and the extent to which they are in balance or otherwise. Although the latest figure of 11 mill. tons for stocks may seem impressive, spread over the whole field of heat and power supplies it does not, in fact, amount to a great deal. A further drop of 2 mill. tons would certainly mean the beginning of unemployment. It is estimated that gas consumed in the households of the nation is equivalent to about 400,000 tons of coal a week and electricity to about 200,000 tons a week. Savings to the extent of 10% in domestic use of both these fuels would yield a saving of some 750,000 tons over the next three months, which would go a long way towards averting a fuel crisis. It is therefore true to say that 'scarcity' is upon us, and some firms are already not getting full deliveries—which means that while production may not yet be actually affected, distributed stocks are being further reduced.

A CUT BY ANY OTHER NAME

THE foregoing gloomy picture was drawn by Mr. Robens at the first of a series of Press conferences which the Ministry of Fuel and Power is holding for the purpose of keeping the Press fully informed of the current fuel situation. As principal witness for the defence, the Parliamentary Secretary was supported by representatives of the three nationalised fuel industries, and his attempt to introduce a new phrase—'under-deliveries'—in place of 'cuts' will we think cut very little ice with the consumer. Among many definitions of this much used word, the Oxford Dictionary reminds us of what is perhaps the 'most unkindest cut of all'—namely, the cut off the joint, a slice or helping of meat (now practically archaic). Housewives who queue patiently at the local gasworks with barrows, prams, husbands, and other contrivances for collecting a meagre 28 lb. of coke—a commodity notably absent from Mr. Robens' statement—will, we feel, fail to appreciate the nice distinction between cuts and under-deliveries. That the British public has not cut up rough before this is only another instance of its almost, but not quite, unlimited patience. The fact remains that whatever capers may be cut by Ministerial Departments in an endeavour to excuse or explain away their failure we are now faced with the necessity of cutting our coat according to our cloth.

A REMARKABLE LAMP

THE January issue of *Segas*, magazine of the South Eastern Gas Board, reprints an extract from the 'Sunlight' Year Book of 1899 on the subject of a strange London gas lamp which combined with its normal function the ability to produce a gallon of hot water by the simple expedient of inserting a half-penny in a slot and pulling a handle. This was not the sum total of the capabilities of this remarkable lamp. For another penny it would supply a compressed slab of cocoa or tea, complete with condensed milk and sugar. It appears that the large post of the lamp contained a tank holding 30-50 gal. of water supplied from the street main. A small quantity of water was carried through a spiral pipe round the lamp flame several times and then into a little boiler right at the top which turned it into highly heated steam. This steam, passing down again, boiled a gallon of water in a separate tank before passing back to preheat the large tank. When the half-penny was inserted and the handle pulled, the gallon of boiling water was emptied into the 'customer's' container, the return of the handle to its original position causing the small tank to be re-filled from the large one. The superheated steam brought the water to boiling point in a matter of three minutes. The

report states that the first lamp of this kind was erected in Southwark in April, 1898, but we cannot discover how many were installed or what measure of success attended the venture. Perhaps the inhabitants of Southwark were not enthusiastic cocoa drinkers. At all events, we can trace no evidence of any universal application of the idea or any record of such obvious refinements as the provision of hot dogs by the insertion of a further penny.

Letter to the Editor

DIETERICHS MEMORIAL FUND

DEAR SIR,—In your issue of November 8, 1950, you were good enough to publish a letter from me appealing for funds for the above fund. We were confident that this appeal would not go unnoticed and I am very glad to say that the success of the fund is now assured and that those many friends of Dieterichs who have contributed can feel that they will be helping to preserve something of his spirit and character.

I would like, through your columns, to thank everyone sincerely for their contributions and say that the fund is still open if anyone has not yet been able to send anything.

In due course, the details of the proposed scheme will be published officially.

Yours faithfully,
HAROLD R. HEMS.

5, Wyvern Road, Sutton Coldfield.
January 27, 1951.

Personal

Mr. C. E. Grimwood, District Gas Manager at Sudbury, Suffolk, has been appointed a Justice of the Peace.

◇ ◇ ◇

Mr. R. Unwin, J.P., of Ashbourne, Derbyshire, has been appointed a member of the East Midlands Gas Consultative Council.

◇ ◇ ◇

Councillor Mrs. R. A. Dixon, of Newcastle-on-Tyne, has been appointed as an additional member of the Northern Gas Consultative Council.

◇ ◇ ◇

Councillor A. W. Arthurton, of Burnham, Bucks., **Councillor W. R. Cowen,** of Kenton, Middlesex, **Councillor H. Olding,** of Slough, and **Councillor J. W. Perotti,** J.P., of Fulham, have been appointed members of the North Thames Gas Consultative Council.

◇ ◇ ◇

Mr. S. C. Waddington, Works Manager with Ashmore, Benson, Pease and Co., Ltd., Stockton-on-Tees, has retired after 43 years' service. He has received a presentation from the employees. Mr. Waddington has travelled extensively abroad on behalf of the firm.

◇ ◇ ◇

Mr. H. J. Jarman, who was Secretary to the former Grantham Gas Company, has been presented by Mr. H. F. H. Jones, M.B.E., Chairman of the East Midlands Gas Board, with an initialled wallet to commemorate service extending over 50 years. Mr. Jarman is now retired. On the same occasion Mr. Jones presented a wallet to **Mr. D. Sloan,** District Inspector, who started work in 1900 and is still employed.

◇ ◇ ◇

Mr. H. F. Potter, of R. & A. Main, Ltd., retired at the end of last year after over 53 years service in the gas industry. At the age of 15 he joined the firm's Bristol branch as office boy, subsequently becoming Branch Manager. In 1916 he came to London as Sales Manager, in which capacity he served for 32 years, relinquishing this appointment two years ago to attend to other activities on behalf of the firm. He was elected Chairman of Section 6 of the Society of British Gas Industries in 1943, and was closely concerned with the negotiations with the Government Departments responsible for the national housing drive after the war and large-scale catering equipment during the war. Mr. Potter is well known in the industry, particularly in the South and West Country where he represented the firm for many years.

Obituary

The death occurred at Mickleover, near Derby, on January 21 of **Lady Elizabeth Ball,** widow of Sir John Ferguson Ball, aged 89. Sir John was President of the Institution of Gas Engineers in 1925.

◇ ◇ ◇

As we go to press we learn of the death of **Mrs. L. L. Bezant,** widow of the late Arthur F. Bezant, Editor and Director of the *Gas Journal* from 1922 to 1928. Their son, Mr. B. P. Bezant, is a member of the present Board of the *Journal*.

◇ ◇ ◇

The death has taken place at the age of 78 of **Mrs. Annie Mary Helps,** wife of Mr. George Helps, of Manor Court, Nuneaton, who was formerly managing director of the Nuneaton Gas Company. A stepson, Mr. George Helps, is at present engineer and manager of the Nuneaton undertaking of the West Midland Gas Board.

Diary

Feb. 2.—Scottish Junior Gas Association (Western District): Open Discussion Night, Royal Technical College, Glasgow.

Feb. 5.—Royal Society of Arts: Cantor Lecture on 'Training for Industry and the Professions,' by Sir Godfrey Ince, John Adam Street, Adelphi, W.C.2, 6 p.m.

Feb. 6.—South Eastern Gas Consultative Council: Adjourned quarterly meeting, Croydon, 2.30 p.m.

Feb. 9.—Institute of Fuel: Brains Trust, 'Coal Preparation, Marketing, Distribution, and Use,' G. S. Jenkins, J. W. Anderson, and H. E. Partridge, Robert Gordon College, Aberdeen.

Feb. 9.—London and Southern Junior Gas Association: 'Education and Training in the Gas Industry,' W. F. Pritchard (Tottenham Division, Eastern Gas Board), 178, Edgware Road, W.2, 6.30 p.m.

Feb. 12.—Royal Society of Arts: Cantor Lecture on 'Training in Industry,' by A. G. Beverstock and F. H. Perkins, John Adam Street, Adelphi, W.C.2, 6 p.m.

Feb. 13.—Institution of Heating and Ventilating Engineers: 'Town Gas and the Heating Engineer,' T. H. Pardoe, R.W.A. School of Architecture, Bristol, 6.30 p.m.

Feb. 13.—Midland Junior Gas Association: 'Outstanding Developments in Ferro-Concrete Construction,' J. A. Milner, Staff Mess Room, West Midlands Gas Board, Birmingham.

Feb. 14.—Institution of Heating and Ventilating Engineers: 'Space Heating,' P. H. Hollingworth, Radiant House, Liverpool, 6.30 p.m.

Feb. 14.—Western Junior Gas Association: Visit to the works of J. W. Singer & Sons, Ltd., Frome.

Feb. 14.—Institution of Gas Engineers (South Western Section): 'Gas Measurement by the Dry Meter,' Stanley Armitage, Taunton, 11 a.m.

Feb. 15.—Wales and Monmouthshire Junior Gas Association: Inspection of works plant, Pontypridd. Three paperettes by student members.

Feb. 16.—Junior Institution of Engineers: 'Modern Practice in the Manufacture of Town Gas,' L. J. Clark, 39, Victoria Street, S.W.1, 6.30 p.m.

Feb. 17.—Yorkshire Junior Gas Association: 'Concerning Carbonisation,' R. K. Atkinson, Wakefield.

Feb. 17.—Scottish Junior Gas Association (Western District): Afternoon visit to the cement works of the Coltness Iron Co., Newmains, Wishaw.

Feb. 17.—Manchester District Junior Association of Gas Engineers: Visit to the works of the Selas Gas and Engineering Co., Ltd., Manchester. Short papers for the F. Johnson Prize.

Feb. 19.—Institute of Fuel: Paper by Dr. W. T. K. Braunholtz, King's College, Newcastle-upon-Tyne, 6.30 p.m.

Feb. 19.—Royal Society of Arts.: Cantor Lecture on 'Training for the Professions,' by Sir Harold Howitt and T. E. Scott, John Adam Street, Adelphi, W.C.2, 6 p.m.

News in Brief

The Scottish Gas Board has been granted permission by the Musselburgh Dean of Guild Committee to proceed with the erection of a messroom and spray baths at the Musselburgh gasworks.

Water Heating.—As part of the continuation classes regularly held for gas fitters, apprentices and maintenance men by the Aberdeen District of the Scottish Gas Board a talk was recently given by Mr. G. F. Jenkins, Sales Manager of Main Water Heaters, Ltd., when the construction, installation, and maintenance of the Thermain No. 2 sink storage heater was dealt with in detail.

Invitations Have Been Sent by the Hartlepool Town Council to north-east local authorities to take action against what it describes as the exorbitant gas tariffs introduced by the Northern Gas Board. The Town Clerk states in the invitations: 'My council feels that the several authorities in the Northern Gas Board area will probably have formed the same strong opinion that the new charges for gas are exorbitant, and I am to ask if you will place this matter before your council with a view to similar action being taken by them.' He adds that his council has protested to the Minister of Fuel and Power and the Gas Board (which has been asked to receive a deputation) and has invited the Association of Municipal Corporations to take action.

The Northern Gas Board has put into operation a new £82,000 water gas plant at Redheugh, Gateshead, which has a capacity of 4,500,000 cu.ft. daily. The plant is entirely mechanical. When the plant was put into operation, Mr. J. E. White, General Manager, Newcastle Area of the Gas Board, said that gas demand on Tyneside was twice as high as before the war.

Output of Gas during the week ended December 16 last, amounting to 14,257,000 cu.ft. was the highest weekly output ever recorded at Kirkcaldy, and was just over 1 mill. cu.ft. above the highest week's output in the previous winter. Highest day's output of 2,169,000 cu.ft. was recorded on December 29, exceeding the previous year's record day by approximately 7%.

The Local Fuel Overseer for Bradford stated last week that coal stocks were going down, and that there was just over a week's supply on the ground in the Bradford area. 'After that,' he added, the position is in the lap of the gods.' An official of the North Eastern Gas Board in Bradford said the coke position, too, was extremely difficult. They were just keeping people going from hand to mouth. Stocks were negligible, and they were supplying it as it was being made. Children at three Bradford primary schools were sent home on January 22 because there was no coke to heat the buildings.

Light on Caithness.—A street lamp, the only one for miles around, has been lit near the shop of Mr. Colin Booth in Canisbay, near John o' Groat's. Mr. Booth, possessed of an ambition to lighten the surrounding darkness, had obtained an old-fashioned lamp standard and lantern from England and had it lit by gas from a container. This beacon can be seen from a considerable distance across open country.

Gasworks Have a Particular Interest in the report submitted to the Secretary of State for Scotland by the Rivers Pollution Prevention Sub-committee proposing legislation to set up rivers pollution authorities. The proposals, if put into effect, may well involve sweeping changes in technique and considerable expense in the form of processing plant to prevent pollution of purified rivers by trade effluent.

A Fuel Efficiency Conference, arranged by the Ministry of Fuel and Power, is to be held at Leicester on February 1 for industrialists from Leicestershire, Northamptonshire, and South Nottinghamshire to consider how coal can be saved. Speakers will include three regional chairmen of nationalised industries: Sir Hubert Houldsworth (N.C.B.), Mr. H. F. H. Jones (East Midlands Gas Board), and Mr. C. R. King (East Midlands Electricity Board). The meeting will consider the facilities at the disposal of the Ministry to assist industrialists in fuel efficiency.

SCOTTISH GAS BOARD'S MOBILE LABORATORY

This trailer type mobile laboratory is now in operation in the Northern Division of the Scottish Gas Board. A 'Vanguard' trailer is used, having internal dimensions of 10 ft. by 6 ft. by 6 ft. 6 in. high, which was equipped and fitted out at Aberdeen with the apparatus necessary for carrying out the normal routine works tests. Fully loaded the trailer weighs about 18 cwt. and is easily pulled by a medium horse-power car.

New Showrooms at Paisley

TOWN COUNCIL'S FORESIGHT PRAISED

NEW showrooms for the Paisley District of the Scottish Gas Board were opened in Moss Street, Paisley, on a busy corner close to the centre of the town, on January 19, the official ceremony being performed by Provost J. O. Lang, who was introduced by Sir Andrew Clow, Chairman of the Scottish Gas Board.

The need for more commodious showroom premises was fully appreciated by Paisley Town Council for many years prior to the vesting of the gas undertaking. Plans for new offices and showrooms had been prepared for incorporation in the new Civic Centre, but as it was felt this project was somewhat distant it was decided to look around for suitable alternative premises. In December, 1948, the Town Council agreed to lease to the gas undertaking ground floor premises in Moss Street for the purpose of establishing there a new gas showroom, and the burgh engineer was instructed to prepare the necessary plans. The Town Council approved the plans for the new showroom in the spring of 1949, and these were subsequently approved by the Scottish Gas Board in July of the same year. The estimated cost of reconstruction was £4,000.

The reconstructed premises consist of a spacious showroom having a floor area of 900 sq. ft. and window frontage of 50 lineal feet. A counter at the rear of the showroom divides the display space from the showroom manager's office and provides facilities for the collection of accounts and for dealing with routine enquiries.

Strategic Position

The premises are situated at one of the busiest corners in Paisley and are only a few minutes walk from the centre of the town. The showroom itself is pleasantly featured on modern lines, the terracing of the window platforms adding both spaciousness and symmetry to the floor space. Attractive hot water and gas fire displays are built into a prefabricated wall along the north elevation. A beautifully designed tripod in the centre of the floor forms a striking gas fire display.

A built-in kitchen on a raised platform in the north-east corner of the showroom provides a pleasing demonstration dais, which can be used for individual instruction or public demonstration as required. Although space did not permit the construction of a separate demonstration theatre, the showroom itself can comfortably seat 100 people.

A false ceiling conceals the pipes and heating ducts, which are all under mechanical control, and supports a delightful scheme of direct lighting skilfully screened to avoid glare.

The showrooms and offices are heated by two gas-fired air heaters; one situated in the basement discharges warm air through ducting into the showroom manager's office, while the unit in the showroom is self-contained, circulating hot air throughout the building.

Following the inspection of the premises the company adjourned for lunch to the Brabloch Hotel, Sir Andrew Clow presiding. After the loyal toast Provost Lang, proposing the toast of 'The Scottish Gas Board,' said that the Paisley undertaking had a high standard of efficiency which the Board was striving to maintain. He was glad they had chosen Paisley as their administrative centre for the county. The staff and workmen in Paisley were second to none and the Board would not regret its decision.

Replying to the toast, Sir Andrew Clow thanked the Provost for opening the showroom. They were also grateful to Paisley Town Council for the insight and foresight displayed in organising the gas activities in the town. The showroom was due largely to the inspiration of the Council before the property was entrusted to the Board, and in its construction they had had the assistance of the council officers, including the burgh surveyor and his staff. The Board hoped it would add to the service it could render to the citizens of Paisley and surrounding districts. He had alluded to the surrounding areas because the activity in Paisley now extended far beyond the boundaries of the town.

A General Linking-up

Sir Andrew was deeply appreciative of the energy and advice given by Mr. J. M. Dow (Group Manager) and his staff. When Mr. Dow took charge of the Group there were 14 independent places where gas was produced. A few of the smaller ones had been closed and they were trying to secure a general linking-up. Seven of the 14 were now inter-linked, and they hoped that three more would follow suit during the summer. They expected that the output in Paisley this year would reach 1,500 mill. cu.ft., representing an increase of 50% since vesting day. It showed substantial progress in a comparatively short time. Almost half the output was used for industrial and commercial purposes. They owed a great deal to the acumen of Paisley Town Council due to which they were able to meet increasing needs.

Proposing the toast of 'The Guests,' Mr. D. D. Burns (Vice-Chairman of the Board) said the fact that the Board was situated in Edinburgh might suggest the idea of remote control. They had come there that day so that people might see what kind of folks were on the Board. Members of the Board, however, also wanted to see what kind of people were on the local authorities. As large builders of houses these authorities were potential customers of the Board. He advised them not to worry too much about the technicalities of the industry. What concerned them was to see that the consumer got a satisfactory service at a satisfactory price. The Board was very conscious of the remote control idea, but it was concerning itself with policy and was leaving the day-to-day management in the hands of the district managers. They expected them to manage their undertakings and maintain the good relationship between the local authority and the public. He thanked the local authority representatives for the co-operation and goodwill shown when the Board took over on vesting day. It had prevented chaos and had resulted in a smooth change-over.

A Notable Conference

The 17th annual conference of the National Smoke Abatement Society, held in Margate from September 27-29, marked the 'coming-of-age' of this active and progressive organisation; and the full proceedings, now published in the form of an attractively produced 107-page booklet, make a noteworthy addition to existing literature on this important subject.

The publication is of particular interest as it contains the comprehensive Des Voeux Memorial Lecture, 'Towards the Better Use of Coal,' by Dr. D. T. A. Townend, Director-General of the British Coal Utilisation Research Association, and important papers on the problem of railway smoke. There are also papers on smoke and health, smoke prevention as applied to new housing, and the presidential address of Dame Vera Laughton Mathews, together with the conference discussions in full.

Register of Teachers

The Council of the Institution of Gas Engineers, on the recommendation of its Gas Education Committee, has decided to initiate a register of teachers for the purpose of disseminating from time to time to those responsible for the tuition of gas subjects (Gas Engineering (Manufacture) or (Supply), Gas Fitting and Gas Salesmanship) in technical colleges and training centres, up-to-date information concerning the educational activities of the Institution, examiners' reports, technical brochures published by the Gas Council and by members of the Society of British Gas Industries, and lists of text books and technical contributions to the Institution and its district sections, the district gas associations, and the junior gas associations.

It is not proposed to make any charge for this service, but it will be appreciated that, as it is likely to incur considerable expense and time, it will be necessary to restrict the circulation to those teachers actually engaged, either whole or part time, in teaching gas subjects.

Teachers wishing to receive documents relating to their particular subject will be invited to register annually with the Institution on registration cards which will be signed by the teacher concerned and countersigned by the principal of the technical college or the head of the training centre.

Registration cards may be obtained from the Secretary of the Institution, 17, Grosvenor Crescent, London, S.W.1.

Attacking the Weakest Links

STOCKTON CONSUMERS' COMMITTEE TOLD OF NEW PLANS

ALDERMAN JOSEPH HOY (Chairman of the Northern Consultative Council) attended the first meeting of the Consumers' Committee of the Stockton Division on January 22. This is the ninth committee to be formed in the Council's area in the past 18 months, and the Newcastle Division is now the only remaining division without a committee. An inaugural meeting for Newcastle is planned in immediate future.

In a review of the work which has been accomplished in the Northern area since vesting day, Alderman Hoy said that the Board had been faced with many problems when setting about the task of knitting the gas undertakings into the scheme and deciding upon the pattern. Many undertakings in the area were ill-equipped and required immediate attention and he was sure that they would all approve the policy of attacking the weakest links in the chain first. The work of providing the machinery for consumers to express their opinion could not have been carried through without the splendid co-operation of members appointed to consumer committees.

Coke Oven Supplies

Mr. F. L. Scaife (Divisional General Manager), in a review of divisional activities, gave details of schemes now in progress for inter-linking the Stockton production plant with the towns of Middlesbrough and the Hartlepools, thus making possible not only the working to capacity of the most economical gas-producing plant, but also utilisation of the maximum storage capacity within these areas. A contribution towards the base load gas supply for the whole of the Teeside and Hartlepools areas would be made from existing coke ovens at Trimdon and from plant in the course of erection at Fishburn Colliery and Stockton gasworks. The route of the Fishburn supply is planned via Sedgefield, Thorpe Thewles, to the Stockton works holders, and when completed will introduce a coke oven gas supply into Stockton area for the first time.

Full advantage of the inter-linking schemes will thus be realised and gas supplies made available over a wide area. This integration of both productive capacity and distribution systems—the need for which has been so apparent for many years—should tend towards a service to the consumer incomparably superior to anything yet attained. The new Stockton plant will consist of the latest type of continuous vertical retorts in a building of modern design and architecture, and will almost double the present productive capacity of the works.

The additional production from this plant has contributed to the necessity for the erection in the Stockton area of a new 3 mill. cu.ft. gasholder, for which the Board has recently placed a contract, worth about £100,000, with Ashmore, Benson, Pease & Co., Ltd., a local firm. The site of the gasholder has not yet been decided and is under discussion between Stockton Town Council and the Ministry of Town and Country Planning.

A new method of gas storage, continued Mr. Scaife, in the form of a high-pressure holder installation, will shortly be put into operation at Haverton Hill for the purpose of stabilising gas pressures in Billingham and Haverton Hill areas. Considerable additions and modifications to manufacturing and purifying plants are being made at the Hartlepool works, including C.W.G. plant, Lancashire boilers, electric de-tarrer, exhausters, and increased purification capacity. The C.W.G. plant when completed will embody the most modern system of automatic control and assist in ensuring gas supplies at peak load periods.

In order to meet the requirements of the new model township of Peterlee, the Board decided to add this rapidly developing area to the boundaries of Stockton Division. A main is therefore being laid from Hartlepool gasworks to Peterlee (a distance of 6¼ miles), thus making available a supply of gas to several townships en route.

NEWCASTLE RECORDS

Gas sales during the year 1950 by the Newcastle Division of the Northern Gas Board were up by 5¼%. The division corresponds precisely in area to that of the old Newcastle-upon-Tyne and Gateshead Gas Company and consequently the comparisons are accurate.

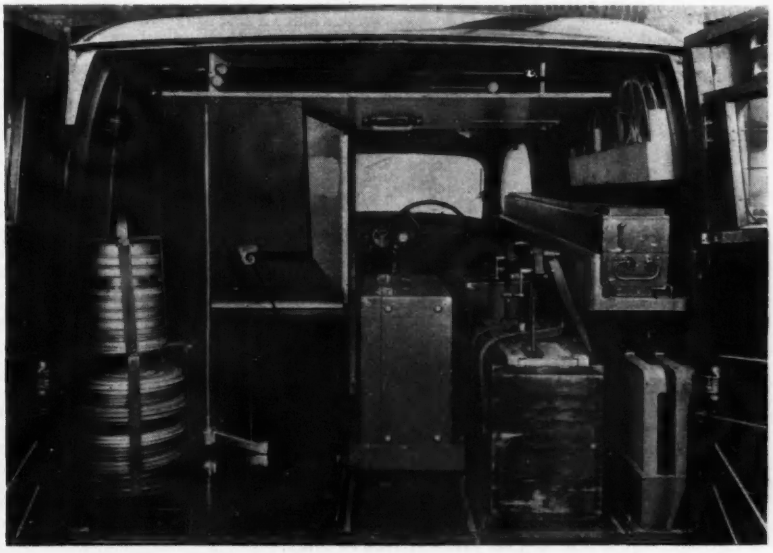
In the winter of the last pre-war year 1938-39 the maximum week consisted of 211,500,000 cu.ft. with a maximum day of 33,290,000 cu.ft. In the first post-war winter, 1945-46, the maximum week consisted of 311,136,000 cu.ft. and the maximum day 47,043,000 cu.ft., while in the winter now in progress the maximum week to date has been 394,342,000 cu.ft. and the maximum day 60,825,000 cu.ft. Sunday deliveries remain interesting in that for the past three winters the consumption has risen from 50 mill. cu.ft. to 51,266,000 and 52,098,000 respectively, and in the present winter has reached a maximum hourly delivery of 4,689,000 cu.ft.

NEW FILM UNIT FOR EAST SURREY

THE film unit of the East Surrey Division of the South Eastern Gas Board has recently replaced its worn out motor-van with a new vehicle specially designed to carry projection apparatus.

The equipment consists of two 16 mm. B.T.H. projectors, two speakers, one daylight screen, one 6 ft. by 5 ft. screen and other accessories, and the accompanying photograph of the inside of the vehicle shows how neatly this apparatus can be packed into a 10-cwt. van. The projectors and speakers are mounted on trollies which enable them to be loaded and unloaded with the smoothness necessary for these delicate instruments.

The East Surrey Division film unit gave last year 348 shows with 29,044 attendances, and the rate of bookings now being made indicates that there will be a further increase in the total shows given in 1951.



Instruments for Measurement and Control

LONDON AND SOUTHERN JUNIORS VISIT ELECTROFLO WORKS

MEMBERS of the London and Southern Junior Gas Association were the guests on January 24 of the Electroflo Meters Company, Ltd. when a most interesting afternoon was spent going round the firm's Park Royal works and seeing something of the extraordinary care and detailed study which goes into the design and manufacture of industrial measuring instruments and automatic controls.

Exterior View of the Park Royal Factory

While the wide range of instruments made covers almost every type of measurement for the industrial field and public utility services, during the visit more attention was paid to those instruments and controls used in the gas industry, and typical equipment was arranged in a series of working exhibits to interest those members concerned in each of the gas engineering fields—*i.e.*, manufacture, distribution and industrial applications. The parties were made up according to these special interests.

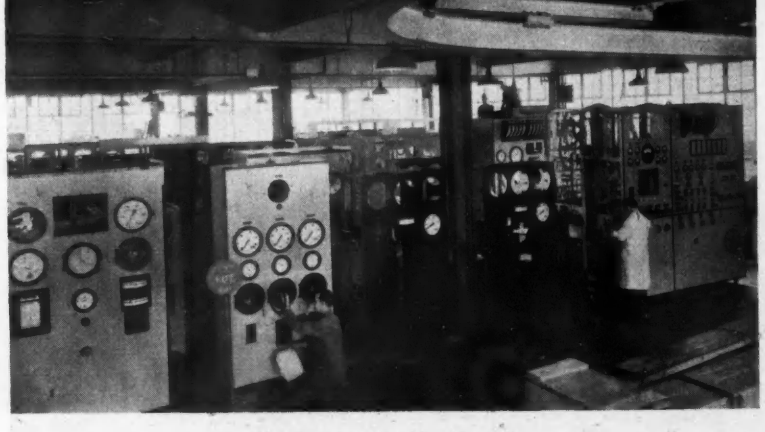
On the ground floor of the works is the panel building shop where the control board framework is constructed from hydraulically flattened steel sheet, all welded to ensure rigidity. After careful preparation, panels are stove enamelled in any colour. Pleasant pastel shades are now commonly adopted by industry. A gas-fired drying oven was constructed by the company on the premises, where temperatures of 250°F. are maintained.

In the panel assembly department, the visitors saw a number of complete instrument panels, and others being wired and piped. All electrical wiring is tested *in situ*, during the final inspection process. An exhibition of photographs showed a few of the many large panels for the gas industry. There are over 100 panels on order for gasworks, ranging in size from 4 ft. to 40 ft. long.

So carefully are instruments packed for all parts of the world, that a breakage is an extreme rarity. Crates as large as a 'pre-fab.' are built around the larger panels.

Hydraulics Laboratory

On the first floor is the hydraulics laboratory, which is one of the most efficient of its type in Great Britain. It possesses several novel features, of which one is the employment of electrical timing. Here, investigation of the performance of differential media employed in the measurement of flow through closed conduits and open channels is carried out alongside routine work of meter testing.



The Panel Assembly Shop.

For the benefit of the visitors, a demonstration was set up to illustrate the use of Electroflo long-distance transmitters of gas flow and pressure. The automatic control scheme shown working employed equipment actually in use for the remote control of terminal pressure and district holder stations. An explanation of this set-up and various systems of telemetering, multi-channel metering, remote supervisory control and remote governor control, was given by Mr. L. James, manager of the firm's gas industries division.

Meter Testing

In the meter test department on the third floor, completed instruments are calibrated to high accuracy standards by means of fine precision testing equipment. Calibration record cards are completed for every meter and filed for reference. Attention was directed to the ring balance flow meters for measuring gas and air flows at low velocities. The transmitting types are widely employed on distribution grids, and form the basis of many well-known remote control schemes. Employed as pressure measuring devices (differential with atmosphere) these transmitters are utilised to advantage in recording terminal or critical pressures on the district. With the inclusion of a clean gas purge system, the same meter can measure foul gas off a retort bench with fair accuracy.

Pneumatic transmitters find wide application in the chemical and oil refining fields, where electrical transmission would be dangerous. There is hardly a liquid or gas which cannot be

accurately measured by pneumatic means if the materials of construction are properly selected.

Other instruments tested and calibrated in this department are draught gauges (liquid and bellows type), gasholder stock indicators, combustion meters, integrators (totalisers), open channel meters for sewage works, automatic summation meters and multipoint strip chart recorders of several kinds. Practically every type of instrument used by works or distribution engineers pass through this floor during the course of a few months.

Pyrometer Department

The pyrometer department specialises in the adjustment and calibration of a wide range of temperature measuring and control instruments, and also produces the many kinds of thermocouples and resistance bulbs required for the gas utilisation field. The range of temperature covered is from minus 330° to plus 3,000°F. The following instruments were seen being tested: Single and multipoint indicating and continuous strip chart recording pyrometers (thermo-electric) and thermometers (electrical resistance); automatic control pyrometers, mechanically operated and electronically operated; reversible motor driven valve regulators; electronic, continuously-recording potentiometric control pyrometers. The last mentioned instrument is one of the most recent developments in electronic methods of furnace control. Its various features were demonstrated by Mr. A. Wright, manager of the pyrometer department. This range of instruments and controllers, in conjunction with the expansion thermometers produced by the process control department, enables the company to undertake the measurement and control of temperature in every class of industry.

The visitors were interested in the 'movement room,' for here craftsmanship of fine watchmaking standard could be seen in the assembly of the delicately balanced galvanometer movements.

In the general assembly department, the smaller instrument parts are assembled to form sub-assemblies and final assemblies, which then pass to the calibration and test departments. A section of this floor tests CO_2 meters and the analysis of fuel gas and flue gases. Working on the Orsat principle of chemical absorption, the all-metal construction of these analysers suit them ideally to arduous conditions of retort house and boiler house. Self-contained and transmitting models are available, and the range for inlet waste-heat boilers is 0-20% CO_2. For producer gas analysis on the CO side of a setting, the range is 0-10% CO_2. A light, portable model combines neatness with high accuracy.

The engineering department on the top floor—comprising an engineering laboratory, model shops, technical reference library and offices—is devoted to the development of new measuring devices, the construction of modified standard instruments for special purposes, and the investigation of problems arising in the industrial application of instruments and automatic controllers. The model shop, situated at one end, is equipped with modern machinery for the rapid production of experimental models and parts, or the modification of standard items. It is associated with the research department and hydraulics laboratory.

Training

The Company has always advocated that its customers' maintenance mechanics should receive some specialised training in the care of the equipment in their charge. The very considerable number of such persons taking advantage of works training annually, has tended to increase rapidly in recent times. The training room is a new development, providing a continuous facility, under the supervision of a senior engineer. Standard courses of two weeks duration cover the working principles of every instrument, and with the assistance of lantern slides, trainees are made familiar with equipment not available for practice. Typical faults are analysed and mechanics obtain a thorough grounding in making adjustments on site to avoid calling on the company's service department without good cause.

The regulator department produces hydraulic and pneumatically-operated heavy duty regulators for applications in gasworks, steelworks, generating stations, etc., for the precise control of vacuum and pressure, gas flow, liquid level, gas mixing and proportioning.

The oil operated series 55 regulator is highly successful as a retort house governor, particularly where, because of sudden surges due to coal charging, coke discharging or bad exhauster governing, extreme sensitivity and speed of action (without hunting) is essential. Many Electroflo regulators are in service controlling steam to producers to maintain constant pressure in the common CO flue. A constant volume of consistent quality producer gas to the setting is thus assured. The setting of these regulators may be altered by remote push button; power cylinders may be remotely mounted and stand-by steam drive is available.

The ratio regulator automatically proportions a diluent (weak) gas where this is employed for the control of calorific value. The flow ratio can be adjusted at intervals by a standard calorimeter.

Quality of Workmanship

After the inspection the visitors were entertained at tea in the works canteen, when Mr. L. E. MEEKS (Director and Works Manager) extended a warm welcome to the Association, remarking that they were one of the largest parties that had been round the Electroflo premises. He hoped they would repeat the visit on some future occasion.

Mr. T. V. GARRUD (President of the Association) thanked the firm for a very interesting afternoon and for its hospitality. A works of this kind appealed to all three sides of the industry. He referred to the quality of the workmanship in everything they had seen and recalled that he himself had been the industrial representative of the gas company in that area when the Electroflo works were built.

Mr. L. JAMES (Manager of the Gas Industries Division) commented that a firm like their's must essentially be very electrically-minded, though the first meter ever sold by the company was an old bell type gas meter. In these days of long distance transmission and remote control, however, they must get together with their electrical friends for the common good — for accurate measurement, recording, and control meant higher efficiency and lower costs generally in the industrial field. In this direction Electroflo was trying to give the gas industry what it wanted. In conclusion, Mr. James mentioned the Radiant Heating system in use throughout the works and also the gas-heated drying ovens.

CHEMICAL DIRECTORY

The Association of British Chemical Manufacturers has issued its 1951 edition of *British Chemicals and Their Manufacturers* comprising a grouping of chemical industries, directory of members of the Association, classified lists of British chemicals, indicators, and microscopic stains, and lists of proprietary trade names and trade marks. The directory has been entirely revised and brought up to date with a view to assisting enquirers genuinely interested in obtaining supplies of British chemicals and allied products.

A number of changes in nomenclature have been made in the list of chemicals. There has been a widespread feeling that certain changes were necessary if only to avoid the use of ambiguous or misleading names. The nomenclature adopted has been based largely on the recommendations of the Chemical Society, but in some instances regard has been paid to commercial usage. The new names have been indicated as cross references to those which the Association feels should not continue to be used, and the hope is expressed that consumer and producer alike will adopt the recommended changes.

The book is issued every other year, the previous edition having been published in 1949, and it is expected that the next will appear in 1953. It is unique within the chemical field in that only references to manufacturers of the products are given against each individual entry. A foreword states that all members of the A.B.C.M. are *bona fide* manufacturers of chemical products against which their names are shown. Where intending purchasers have any difficulty in obtaining particular products they are asked to write to the Association. Copies of the directory are available, free of charge, to persons or firms genuinely interested in the purchase of chemicals, from the A.B.C.M., 166, Piccadilly, London, W.1.

American Gas Appliance Industry

CAPACITY DOUBLED IN NINE YEARS

WRITING in the January 4 issue of the *Gas Age*, Mr. Frederic O. Hess, President of the American Gas Appliance Manufacturers' Association, comments on the fact that 1950 was not only a peak year for gas appliance sales, but furnished proof that their industry enters the critical period ahead with more than double the facilities, the manpower, and the productive capacity commanded in 1941.

The year 1950, continued Mr. Hess, saw practically all phases of the gas appliance manufacturing industry attain new sales peaks. For the first time, domestic gas ranges surpassed the 3 mill. mark; automatic gas water heaters soared far above 2 mill.; while gas-fired central house heating equipment went well over the 1 mill. mark. Incinerators, dryers, and hotel-restaurant equipment were also well ahead of previous years.

It is difficult to determine the exact level of business activity for the coming year. Present estimates on the availability of metals and production facilities indicate a possible reduction of 20 to 30% in gas appliance production next year. This reduction will not permit the gas appliance industry to meet the ever-increasing consumer demands, brought about mainly as a result of three basic factors—the increasing replacement rate of obsolete appliances; the normal growth of the gas industry which adds approximately 1,400,000 homes to its lines annually; and the introduction of natural gas.

Industrial gas equipment manufacturers also had a record year during 1950. This was due partly to the peak production enjoyed by all industries, but was mainly due to the ever increasing acceptance of gas as an industrial heating and processing fuel. The increase in the use of industrial gas can readily be illustrated by the steel industry which during the past year has consumed far in excess of 750,000 cu.ft. of natural gas per minute.

On December 31, 1950, an estimated 28,250,000 homes were utilising gas service. This indicates an increase of 1,360,000 homes over the 26,890,000 homes using gas at the end of 1949. Since January 1, 1946, the gas industry has increased its residential service by 7,204,000 homes.

The following table shows the various major gas burning appliances installed during 1950, compared with 1949:

	1950	1949	% Change
Domestic Ranges ...	3,100,000	2,069,600	+ 49.8
Automatic Water Heaters	2,300,000	1,466,000	+ 56.9
Central Heating Equipment— ...			
(*a*) Furnaces ...	631,000	297,000	+ 112.5
(*b*) Boilers ...	82,000	50,000	+ 64.0
(*c*) Conversion Burners ...	368,000	290,000	+ 26.9
Total Central Heating	1,081,000	637,000	+ 69.7
Floor and Wall Furnaces	650,000	372,000	+ 74.7
Direct Heating Equipment ...	2,100,000	1,453,000	+ 44.5

All promotional plans of the gas industry will be continued. The growing demand for household gas incinerators and gas clothes dryers has created a new and profitable market for dealers and manufacturers alike. Increased industry-wide promotions backed by dealers, gas utilities, and manufacturers are planned for 1951. Gas refrigerators will continue an intensified programme of promotion and advertising of new models during the coming year. Plans have been made for the active promotion of gas house heating in predominantly local campaigns sponsored by local utilities and including strong dealer tie-ins.

The manufacturers of gas water heaters will sponsor a special health booklet designed to dramatise the necessity of adequate hot water service in the national emergency. It will be distributed throughout the nation, to Government agencies, national, county, and State health groups.

in the next issue of GAS SERVICE . . .

will be found . . .

in addition to regular features and serial articles, news and views and personal paragraphs

A Study of Visual Aids

The rapid growth of visual aids in schools is a striking example of the changing character of education. One of the first industries to perceive the value of co-operating with school authorities was the gas industry, and many people in the industry have had some experience of assisting in 'gas projects.' Unfortunately few of them have had an opportunity to experiment in this medium, and it is with the hope of assisting them that we publish an exclusive article on the subject by W. A. Yerbury, a specialist employed by the North Thames Gas Board.

* * *

Gas in Aircraft Production

Under the title 'Gas and the Comet,' the *Journal* published last week an account of part of the process of aluminium production employed for the construction of the famous De Havilland air liner—a process in which gas plays a considerable part. The February issue of 'Service' tells the whole story in considerable detail, and is of great interest to industrial departments, since it is one of the first accounts published of the contribution by gas to this vital industry.

* * *

Overdue Accounts

The collection of overdue accounts is a nuisance but a necessity. Much depends on the manner of approach; tactful handling can keep a customer, while clumsy demands may lose one. In the opinion of G. Shepherd, in a paper presented to the Home Counties (Western Area) Circle, the salesman is the ideal person for this job, since his credentials — diplomacy, technical knowledge, ability to converse, and belief in gas—are just what is required for the collection of accounts. The author puts his case convincingly, and deals at some length with various reasons for non-payment.

* * *

Improved Distribution Practice

Under this title, G. Hodgson, in a paper to the Eastern District (Northern Area) Circle, sets out a number of practical suggestions for improving the efficiency and economy of distribution departments. Some of these are familiar; some are new. All are interesting and provocative.

* * *

Other Features and Comment

Editorial comment is primarily concerned with reflection on the recent B.E.A. report. This document, while providing an interesting sidelight on our competitors, clearly points some important morals for the gas industry. In lighter vein is the story of the mechanical elephant of Thaxted, which owes its tough 'hide' to special drying by gas. Exhibitions reviewed include the Schoolboys' and the current exhibition of catering appliances at Brighton. Showroom windows, Salesmen's Circle news, and the regular technical articles combine to produce a balanced issue, full of interest to sales, distribution, and fitting staffs.

This number will reach subscribers early in February

Published from the Offices of the *Gas Journal*, price 9d.

The Basic Factor

By J. E. BRANDON, Assoc.M.Inst.Gas E., A.M.Inst.F.,
Sheffield and Rotherham Division, East Midlands Gas Board

In this paper to the Yorkshire Junior Gas Association the author stresses the importance of adequate apprenticeship training schemes with particular reference to the methods adopted by the Sheffield undertaking.

As my training experiences have been mainly on the distribution side of the industry, I approach the 'basic factor' from that angle. In the Sheffield undertaking we have 65 apprentices. These are in the following age groups:—

Age Group.	No. in Forces on National Service.	No. Ex 18 Months National Service.	Total.
(a) 20-21	*Nil*	4	5
(b) 19-20	2	*Nil*	5
(c) 18-19	2	*Nil*	12
(d) 17-18	*Nil*	*Nil*	9
(e) 16-17	*Nil*	*Nil*	12
(f) 15-16	*Nil*	*Nil*	22

From (a) it would appear that by early 1951 we should have four qualified fitters. One of this group will be entering H.M. Forces, but four have yet to pass the Intermediate City and Guilds Certificate in Gasfitting.

During 1951, from (b), another five should be qualified, but three of these have yet to serve in H.M. Forces, and the returning two have to obtain the Final City and Guilds Certificates. From 1952, 12 apprentices will be available, but it will be noted that 10 of these will have to enter H.M. Forces. At about this period it is anticipated that from retirement alone 10 fitters and three district inspectors will leave the undertaking. In other words, there will be no gain in the number available for service to the public.

The management, realising this, engaged a number of apprentices during August, 1949, and the early part of this year. These are accounted for in (e) and (f). If this recruitment is maintained it will enable a more efficient service to be given to the public.

On entering at 15 years of age, a youth is placed on probation for 12 months. If he is from a technical school, or 16 years of age on entering, this probationary period is reduced to three months. Practical instruction is given on the district by various fitters on various types of work. In addition the apprentices receive instruction in the following:— Meter department, stores, stove repairing department, industrial department, connection and brass shops, blacksmiths' shop, plumbers' shop, and mains department.

The periods in each of these vary from one to three months and are interspersed over the whole apprenticeship. For example, the apprentice must be 18 years of age when he goes to the mains department.

It is to be regretted that owing to lack of accommodation all the youths cannot be fully trained in the use of tools before being put on the district, but on first joining the undertaking they are put in the brass and connection shop under first-class fitters, where they are instructed in the making of joints and bending of lead. In addition, it is a condition of employment that apprentices attend the courses organised in conjunction with the local education authorities.

I consider that we have, in the last few months, made four definite advances:—

(a) When the probationer apprentices commenced training in the early part of 1950—that is, before the closing of the evening classes in May—it was discovered that local education regulations did not permit any student to be enrolled for evening trade classes under the age of 16 years. Rather than allow these probationers to miss valuable instruction the management, when approached, agreed that they should enter on a preparatory course.

(b) From the examinations in this group it was found that there were a number of advanced students. Rather than keep this advanced section in their age group it was decided, in conjunction with the technical college, to form a part-time day trade course for students under 16 years of age. From this it will be apparent that the more intelligent youths will be placed in the second year of evening courses, and this should mean that the Intermediate City and Guilds Examination can be taken at 16½ and 17 years as against the usual average 17 to 18 years.

(c) The third advancement, and really the biggest, was when the technical college applied to the City and Guilds of London Institute for permission to grant a full Technological Certificate in Gasfitting. This was approved. Senior evening classes were then re-organised to cover the ancillary subjects necessary. This is being done with only two evenings and one Saturday morning over the five years, excluding any summer session. This should encourage students to possess the full Technological Certificate in Gasfitting.

(d) The ancillary subjects such as drawing, mathematics, science, etc., are being applied from a 'gas' point of view.

The holder of the full Technological Certificate in Gasfitting has several advantages:—

He will be exempted from the first year of an approved course in gas technology (supply), engineering science (S.2), and chemistry (S.1) in the second year, and from engineering drawing (S.2) in the third year. (Regulations of the City and Guilds of London Institute.)

The student has only to take gas technology (supply) third and fourth year, and mathematics (S.2), which incidentally is covered in the advanced second year of gasfitting. Therefore, any student in the last year of apprenticeship is in an excellent position to advance on the consumer service and sales and/or full Technological Certificate in Gas Supply. This last certificate is considered to be on a plane between I.G.E. Ordinary Grade Gas Engineering (Supply) and the Higher Grade Gas Engineering (Supply).

The results of the Technical College's sessional examinations held last April show weaknesses in subjects such a English, science, mathematics, and drawing, and it is considered these are essential to any apprentice seeking promotion.

It was expected that the lower age group (15-16 years) would show an improvement in basic subjects in view of the extra year at school (14-15 years). As a point of interest this extra year costs £40 per head, according to the Ministry of Education. Facilities for instruction and education generally are much improved; certainly they far exceed what most of us had. The management and present day leaders of our industry have brought education very much to the forefront, as follows:—

(a) It is often a condition of employment.

(b) Fees for tuition and examinations are paid upon satisfactory record.

(c) Time allowed from normal working hours.

The apprentice does not fully appreciate this as being a

privilege. Are things too easy? I feel the apprentice often looks upon evening classes as a thing apart from day training.

Another approach for encouragement can be from the union. At Sheffield the appropriate union has representation on the Board of Examiners for Technical College Sessional Examinations. The shop steward is encouraged to speak on certain occasions to would-be 'wayward' apprentices, as one workman to another. This has had good results, and I feel it will continue to have them in the future.

Although the apprentices are under instruction two evenings and Saturday morning each week, in addition they receive half-an-hour's tuition each morning, making a total of 9½ hours per week. These youths are under the influence of district fitters for at least 40 hours per week, and I regret that a certain class of these fitters look upon further education generally as being 'new-fangled' and unnecessary. These opinions are often voiced only too loudly with an audience of easily influenced youths, with detrimental effects.

This is assured by effective co-operation with educational authorities and teachers who report absentees to the department. These are interviewed at work and reminded of their lapse, and it is pointed out that attendance and satisfactory progress are conditions of employment.

A low percentage of youths is told at school about jobs in the gas industry. It is suggested that more propaganda could be given to the schools *via* the teachers' Press, and plenty of literature be distributed to technical schools. I appreciate the value of the publication 'Careers in Gas Industry,' but feel this is a book for the career-seeker who has already heard of the gas industry, whereas we are attempting to attract suitable material from persons who have heard very little, if anything, of it.

TRANSPORT AND STORAGE OF COAL

The following is an abstract by Our Own Correspondent of a paper read by L. G. Locket to the Institute of Fuel on January 16.

TRANSPORT costs of coal are a vital factor in the siting of industries. This is a reason why really large consumers of coal tend to establish themselves where the low cost of sea transport can be realised—*e.g.*, in London, on the banks of the Thames. Ten or 12 years ago a consumer was at liberty to buy whatever coal suited his purpose provided he was prepared to pay the cost of the coal and that of transport to his premises. The function of the distributor was to advise the consumer on the best source of supply. Now his power to perform that duty has largely disappeared. Today the distributor makes his contract with National Coal Board for those descriptions of coal which are allocated by the programming authority, a state of affairs which is likely to persist as long as demand substantially exceeds supply.

Consumers' requirements tend to be subordinated to railway conditions. Economy in the use of wagons and locomotives, paramount in wartime, continues to be imperative in the post-war period of reconstruction, rebuilding and re-conditioning. In the ideal, if a consumer wishes to use a particular coal from a particular coalfield and can pay the railway rate he should be allowed to order it and get it. It is hoped that this is the ultimate goal of the Railway Executive and the National Coal Board. The position of the distributor is discussed.

In rail-borne transport the tendency is towards bigger units of conveyance. The several types of wagon in use are briefly described. In the 19th century, six, eight, and 10 ton wagons were the normal sizes. Ultimately, about 580,000 mineral wagons, nearly half the total main-line wagons in the country, were privately built and owned. These were all vested in the Transport Commission in 1948. In 1923 a standard 12 ton wagon was designed and adopted as the future standard and further building of smaller ones was prohibited. Railway companies and private traders (encouraged by a 5% rebate) were building larger ones. Finally, the Ministry of Transport has now adopted a 16-ton five-door all-steel specification, the doors being two side, two bottom, and one end door. Common ownership has simplified sorting and shunting. Demurrage charges are high and understandable, but sympathetic consideration should be given to circumstances beyond the control of the consignee.

Canal transport is only relatively cheap when loading and receiving points are both served by canal direct. On most of our inland waterways the size of barges is limited to 25/30 tons capacity.

The difference between rail and canal transport and sea transport is that the ship is not a standardised unit. The practicable size of the ship is, however, limited in certain cases—*e.g.*, steamers going above the bridges of the Thames, by bridge clearances, depth of water, berthing accommodation. Demurrage charges are necessarily high, demanding quick methods of loading and discharging. The complicated arrangements which may have to be made for shipping are described.

Handling problems at the consumer's premises are discussed particularly in relation to rail-borne supplies. Reception of large quantities requires some form of mechanical tipping. Reference is made to the several types of wagon tipper. End tippers suffer from the disadvantage that many wagons (including the standard wagon) have only one door, sometimes therefore requiring either a turntable or two tippers. The rotary tippler eliminates all trimming; the coal is discharged into a pit or hopper below ground. With the alternative side-tipper the wagon is raised in the air and discharges well to the side of the track at a height of several feet above ground level. This height can be increased by combining it with a hoist to lift the wagon before tipping. These tippers can effect considerable saving in excavation. 'The side tippler can also be constructed in mobile form to allow for discharge at any point alongside the track.' When the quantity to be handled is relatively small the tilter or semi-tippler may be used, rotating the wagon through 90° enabling it to be finally cleared by hand with little labour.

Storage of coal is classified under two headings, 'a tactical reserve and a strategic reserve,' the former to meet day-to-day fluctuations in supply, the latter to provide a definite stock against long-term shortages. Coal is put into and taken out of the tactical reserve at frequent intervals. This storage may, therefore, be fully mechanised with cranes, grabs, and conveyors, etc., for stocking and reclaiming. The strategic reserve may lie for long periods and handling in and out of this stock must be carried out with plant of low capital cost. In this class of stock there is the problem of over-heating.

When coal is first stored the temperature usually rises to a certain level (which may be 'critical,' usually between 130° and 170°F., involving a risk of fire) and then subsides, after which there is little risk of further trouble if the critical temperature has not been reached in, say, seven to eight months. In the prevention of fire risk the first consideration is the type of coal to be stocked. 'Sized coals containing a very small percentage of fines are the most satisfactory for stocking purposes.' This class of coal can be kept at a safe temperature by ventilation, but when any 'appreciable percentage of fines is included in the coal, ventilation is no longer effective and measures of an exactly opposite nature are necessary;' sealing-off becomes preferable to ventilating. It is suggested that a low wall should be built round the storage area to exclude air from the base of the heap, that coal should be stocked to a height of 6 ft. and then well rolled down. If heating has not occurred at the end of seven to eight months a second layer may be superimposed and again rolled down. Pipes should be inserted in the heaps, thermometers should be inserted in the pipes and readings taken at regular intervals. A slow steady rise in temperature is to be expected, 'a rapid rise is a sure warning of overheating which will almost certainly result in a fire.'

In his conclusion, Mr. Locket discussed briefly the relative economy of road haulage over short distances. Any general application of this form of transport for large quantities over long distances would meet with insuperable difficulties. The mechanisation of distributors' depôts is also briefly discussed. 'The advantage of mechanised depôts may in theory be great, but they may in practice prove illusory.'

Raising Works Efficiency by

PRODUCTION STANDARDS AND PLANNING

By L. W. JARRETT, M.Inst.Gas E., M.Inst.F.,

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***EDITOR'S NOTE:*—In this paper to the Eastern Junior Gas Association at Peterborough, on January 19, the author deals with production standards and points out how planning can help in raising efficiency. He quotes the instance of where, after thorough examination of a horizontal retort house (its structural condition, working schedule, and so on) it was thought that an increase of 10% in production could be effected. In the event an increase of 20% was achieved.**

SINCE nationalisation, the gas boards have planned and started many schemes for the reconstruction of their manufacturing stations. There is no doubt that this work will increasingly affect the efficiency of production, if indeed it has not already done so. However, apart from the improvements in efficiency which will come with reconstruction, we must continue to operate the existing plant in the most efficient manner. We might consider the case of a works where the plant has been in operation for a number of years. How do we know that such a works is operating efficiently?

Many such stations can run efficiently because they fix a standard to be achieved. Without a standard for comparison one does not know whether a works is efficient or not. It follows that to obtain efficiency on a gasworks the first thing to do is to determine standards for production. A first step in this direction is to construct a yearly production chart.

Yearly Production Chart

The examination of output has been the subject of other papers and it is not intended to discuss this matter here, but for the purpose in mind it has been found quite satisfactory to plot consumptions for several previous years and make estimates from these graphs, taking into account any anticipated loads of large degree.

When the output line has been determined in terms of weekly demand, the next step is to work out the production plant which will be necessary to meet this demand. This will require the planning of dates for the shutting down and restarting of plant and taking into consideration the arrangement of work with contractors. From this it can be seen that the production chart should be prepared well in advance of the year for which it is intended, and that it brings to the fore consideration of major plant repairs. Most well-run works have major repairs scheduled for a number of years ahead and this policy undoubtedly pays dividends.

Together with consideration of the dates for major repairs of plant, a balance has to be obtained always to have a reserve of plant available to produce the estimated demand. This is where our standards for plant production have to be set. To set these standards it is first necessary to have an intimate knowledge of the plant concerned. One is tempted to suggest that the makers' original guarantee figures be taken as data, as they do not generally make plant without a margin of safety in this matter. When these figures have been obtained compare them with what has recently been achieved. If these achieved and guarantee figures show a large difference, find out the reasons for this, and be sure they are good reasons if the gap represents a deficiency. Generally, I think you will find that slightly better than guaranteed figures can be achieved. In this connection I would quote an actual case of a works where after an inspection of the horizontal retort house, its structural conditions, working and carbonising charging schedule, etc., and consideration of its production figures as above, it was thought possible to increase its production by 10% or more. In actual fact, increased production up to 20% was effected and this increase during bad weather was instrumental in enabling normal pressures to be maintained on the district.

When fixing standards for water gas plants which are manually clinkered, apart from taking into consideration the effects of the type of coke being used compared with that required by guarantee figures, it is advisable to check the percentage of time spent in actual production; it will probably be found that this figure is very revealing.

It is necessary, of course, to ensure that the production standards fixed for the plant can be maintained, and this factor must be considered with those already mentioned. Then with efficiency standards fixed for the plant, the production chart can be completed. If, after this, you achieve your chart figures you will know that your plant is operating efficiently.

The chart should include programme lines at the top for each section of plant. This apart from showing when each plant will be at work, also assists in the preparation of the works maintenance programme, etc., which will be referred to later.

It is well worth the time required to produce a yearly production chart as it has many other uses in addition to that of setting standards of production. A few of these are summarised below:—

1. It shows at a glance what plant is available or shut down.

2. At times of peak demands it shows what production can be expected and what surplus gas-making capacity is available. This becomes more and more important with divisional or sub-divisional operation where works are inter-connected. If charts for each works are compiled, they will show where gas can be obtained to assist the districts where pressure cuts might otherwise have to be made. They can also show where transfer of gas might enable full use of base load plants with resultant better load factors for these plants and therefore more economical work.

3. It enables the early calculation of such figures as estimate for coal, and oil requirements, the production of coke to be expected, the percentage of water gas, etc., to be used. These figures are very necessary, and a basic reference for their easy calculation is extremely useful.

4. It assists in the production of a planned works maintenance programme.

Mechanical Handling Plant

In these days when labour is difficult to find, the employment of such means as are available to handle materials mechanically assists in the smooth working of any establishment handling materials in bulk.

The latest developments are always worth investigation with a view to their adoption for the various difficult and sometimes

onerous tasks which must be performed on a gasworks. Take, for example, the stacking of coke or coal. We have become accustomed to the common type of elevator driven electrically or by petrol engine, which was designed more or less on mass production lines by manufacturers seeking to sell their product in the widest field. Manufacturers these days are taking far greater interest in producing special machinery for particular work. They have now produced elevators which can perform this task with an ease which would not have been considered possible, say, 10 years ago. The raising and lowering of such plant is performed hydraulically, thereby avoiding the loss of time experienced with the earlier types of machines; and the manœuvrability of such apparatus has also been considerably improved. This does not suggest that any one appliance is suitable to your particular needs and your choice should be very carefully considered. In fact, it should be emphasised that a good job in mechanical handling can be obtained only by considering each case strictly on its merits and not by the use of odd items collected together because they are easy to obtain.

There is another aspect of the case for modern mechanical handling equipment which comes to the fore these days whenever it has to be considered, and that is the considerable capital expenditure which might be necessary to obtain the right machinery for the right job. While I have heard it expressed that the saving of labour of one man is worth the expenditure of £4,000, you may be able to achieve considerably more efficiency with the plant already at your disposal. As an example of this, I would mention that I have seen elevators fed by hand by as many as four men at a time. The construction of small portable hopper feed to such an apparatus would enable this to be done by a mechanical shovel, thus removing the labour of two men for a small capital outlay of, say, £30 plus mechanical shovel at £900. This expenditure comes well within the above suggested £4,000 capital outlay to replace one man, even if a new shovel has to be bought.

Modern mechanical handling apparatus has the advantage of doing the job at a far greater speed than manual operation and in most cases with better results. However, much depends upon the operators and the clearness of the instructions given to them. I would like to add a plea that when coal or coke is stacked on your works, see that the stacking is done properly. It does not cost any more to do the job in a manner which will result in neat and tidy stock heaps; unfortunately some of the stacks in our works today are a positive disgrace. Apart from the appearance of a stock heap, if it is finished off and properly levelled, it will be much easier to obtain accurate figures when stock-taking becomes necessary.

I am pleased to note that manufacturers have at last started to produce mechanical shovels which are capable of operating in restricted headroom, and also on a small turning circle. Although this type of plant is not yet in common use on our works it will in due course be responsible for the removal of a gasworks headache which has existed too long—the handling of spent oxide below overhead purifiers. I do feel that if mechanical handling is going to progress as fast in the next few years as it has done since the war, then many of our problems requiring large labour squads for very disagreeable work are going to disappear.

Raw Materials

When efficiency on a gasworks is being discussed, thermal yields are amongst the first figures to which we refer. This invariably leads to a fault-finding discussion concerning the deterioration of the quality of coal which we are receiving. I am aware that we do sometimes receive coals with 12-15% ash, and the effect of that on thermal yields, producer practice, water gas manufacture, and the rest is well known. However, I do not agree that the coal as we receive it these days has deteriorated to the extent to which some would have us believe.

There are now appointed to most of the gas boards officers who are responsible for the purchase and control of coal supplies. When it is known on a works that some very bad coal is being received it should be immediately reported to these officers so that the matter can be dealt with in the proper manner. Then the coal quality can be the last item talked about when investigating works results.

If yields are low, then the retort temperatures, chamber conditions, producer conditions, retort ironwork, chimney pulls, etc., should first be investigated. All works engineers would be pleased to receive only the best carbonising coals as this would give less trouble in their plants. However, the additional expenditure necessary, even supposing such coals to be available, may outweigh the extra yields of efficiency to be obtained. This is a matter to be considered carefully. I know that this argument does not hold good if the coal being received is of poor quality costing more or less the same as coals of good quality, and in this case, as previously mentioned, it is advisable to make strong representations to the board's coal supplies officer.

Reverting to my original suggestion that some would have us believe that coal supplies these days are considerably inferior to those obtained prior to the last war, the following table which has been compiled from the test records of a large gas undertaking does not seem to bear out this assertion.

Averages of Ash Determinations on all Coals Received.

Year	% Ash	Year	% Ash
1932	7.4	1939	4.4
1933	6.0	1945	6.7
1934	5.8	1946	6.2
1935	5.2	1947	6.8
1936	6.1	1948	5.8
1937	6.5	1949	6.8
1938	5.6	1950	6.0

It is probably convenient to suggest that the work of the carbonising superintendent or technician in charge of the retort house is as important as any. This fact has not always been recognised and a junior from the laboratory was often expected to control heats and take charge of the retort house. This state of affairs, I am glad to say, seems to be dying a natural death, and we find these days that the Technical Press has contained more advertisements of vacancies for carbonising technicians.

The question of getting maximum yields from raw materials is the same in any industry and can be applied in the same way equally to water gas production, concentrated liquor production, etc. In other words, it is no use whatsoever just running the plant and accepting what is produced. A definite standard for production should be set out and constantly achieved in quality and quantity. When the plant is regularly producing over its standard, then it can be said that it is running efficiently.

Machinery

The machinery operated on a works for gas production is both expensive and complicated. The reasons for the difference in condition of such plant on different works are usually apparent. We often hear that lack of labour is responsible for the bad conditions, and although this may have some bearing on the matter, I would say that lack of maintenance is probably 90% of the trouble. The maintenance of machinery is one of the most expensive items in the standing costs on a gasworks. It is also one of the most difficult costs to control. Many gasworks operate on a day-to-day basis and deal with maintenance work as repairs become necessary and show themselves. This method should be done away with, as it is working to a break-down system. Undoubtedly the best way to obtain control of maintenance costs is to plan and formulate a definite plant maintenance system. The adherence to a set programme for the overhaul of all machinery and plant on the works undoubtedly pays once a system has been in operation for, say, a year or so, and the liability to break-down has been largely eliminated. It is, of course, necessary that when a system has been laid down the maintenance people must see that it is strictly carried out. By this I mean that if a certain

steam engine is scheduled for overhaul at regular intervals, then when the date occurs for this overhaul this work must be done, even though the engine is apparently running in perfect condition. This can, of course, be carried to the length of replacing parts at definite intervals, and although I have not found this procedure to be necessary on gasworks machinery, except in the case of bucket conveyors, the regular overhaul does give the opportunity of ordering and obtaining spare parts for replacement before the old worn parts cause failure.

To prepare a plant maintenance system, the first step is to make a complete inventory of all machinery and plant. Whilst making out this inventory it will probably pay to sectionalise the machinery into groups of like character. Having completed the inventory, have some copy sheets made out with 52 vertical lines for the weeks of the year. In an extra column allowed on the left hand side of the sheet enter the items from your compiled inventory. Next, date off the heads of the column lines, so that each space represents a period of one week's duration. The period for which each item of plant will be able to run between overhauls now has to be determined. This is a matter of experience which you have probably already obtained to a large degree in the day-to-day operation of the works.

Some items are easily dealt with. Take, for example, boiler overhauls. Boilers have to be inspected at intervals of 14 or 18 months, according to the previous report by the boiler inspector. Thus the date for the overhaul of an individual boiler is determined to a large extent by the date of the next official inspection. It is never advisable to run a boiler to the limit of its inspection period. Due to the shut-down or starting-up of production plant, it may not be possible by reason of lack of waste heat boiler capacity to produce the steam required for normal works operation. Therefore, it is always advisable when scheduling boilers for overhaul to see that they come due on an average of two months at least before the boiler inspector's scheduled date.

When the intervals between the necessary shut-downs for your plant have been decided, the maintenance chart should be filled in with dates fixed for the shut-down of each individual item. If it is considered that a week will be necessary to overhaul a machine on the date in question, fill in one complete square of the chart; if two weeks are necessary, make an oblong covering the required dates.

A Maintenance Programme

While you are fixing the dates on the chart for the overhaul of your machinery you will find that the yearly production chart already compiled will be of great assistance. For example, if condensers are to be cleaned out then obviously they should be done when an appropriate section of the carbonising plant is off for repair. Another consideration with the same condensers is that if they are on a stream still live to foul gas, they should be done early in the year thereby safeguarding the cooling of the gas during the summer period when atmospheric temperatures are high. These considerations obviously limit the period on the programme which can be allocated to cleaning condensers. In a similar manner a case could be quoted for exhauster or generating plant overhaul, etc. When this planning is completed there will emerge a programme for the maintenance of all the works plant.

This method of planning need not, of course, be confined to the work of the engineer but can and should in due course be extended to cover the work of the painters, bricklayers, carpenters, etc. With the programme completed its operation becomes a matter for organisation of shop personnel and craftsmen. One method is to remove all items from your plant schedule at the beginning of a month and allot them on a programme sheet to the various members of the staff as their work for the ensuing month. If this is done and all jobs not completed at the end of the month are strictly carried forward, then you are sure that your programme is being worked in a manner which is bound to have its reflection on the efficiency of your works plant.

It follows that when a proper maintenance scheme is being run on a gasworks certain records become necessary to complete the system. It is not necessary to keep very elaborate records, but such as are maintained should be capable of giving plant history, repairs executed, replacements of parts, etc., for reference purposes. It is sound practice to carry out quarterly or half-yearly inspections of carbonising plant, and also to have recorded any repairs or replacements which take place to the plant in between times. In other words, for the carbonising plant, apart from the normal records of working days and dates for shut-down and starting-up, records should always be kept of the replacement necessary for ironwork and repairs executed to refractories. If this is done, it is always a comparatively simple matter, when the time comes, to assess and decide what repairs will have to be done and when they will be necessary. Another very helpful record is assisted by the suggested plant maintenance programme. If a card index system is maintained with each card being allocated to individual items on your maintenance programme, then it is a simple matter for the engineering staff to note on these cards exactly what is done, what new spares are used, and so on, when the overhaul is executed to the planned schedule.

Works Services

A gasworks of any size usually manufactures its own services in the form of electricity, gas, and steam. Whilst the individual items which produce these services will come into line on the planned programme, if you are to have an efficient works it is necessary to maintain a strict watch on the working and expenditure on the works for these services. The electricity, gas, and steam power used on the works is an overhead, and if these overheads increase, then a standing charge on the cost of production also increases. If, therefore, the meters registering consumptions of these overheads are regularly read and booked, and then comparison made of the weekly or daily readings year against year, any abnormal increases will show up quickly. As an example, take the consumption of gas on a gasworks. A normal works consumption which had been comparatively steady for two or three years previously, began during a summer period steadily to increase. The records showed this up, with the result that an investigation was carried out and it was found that the services in a retort house which had not been used for some time were still live. The remedy, of course, was to cut off the the supply to this retort house, and the figures in the records then began to show considerable improvement. I do not wish to labour this point, but it is a fact that wastage of electricity, gas, and steam can be very expensive, and any methods devised, however simple, to retain a check on such consumptions are always worth while.

Staff

One of the assets of any specialised industry, and a very important asset, is the skill of its employees. This was realised when Parliament drew up the Gas Bill, and Part I, Section 4 (i) makes the provision that 'it shall be the duty of every area board in consultation with any organisation appearing to them to be appropriate, to make provision for advancing the skill of persons employed by them, including the provision by them and the assistance of the provision by others, of facilities for training and education.'

The area boards, in their turn, have taken this matter very seriously, and you know that many schemes and arrangements have been made to cover this provision of the Gas Bill. In fact, there is now no doubt that the occupier of the humblest position on the gas board has every opportunity in his own hands to rise to the very top. Many schemes have been prepared that will in future ensure that the youth with technical ability will find in the industry a natural outlet for that ability; that the youth with personality, and flair for salesmanship will be encouraged to sell. It is interesting to note that some of the boards have already appreciated that if the skill of their technicians is to improve, then one of the best ways to promote improvement is to afford all technicians the opportunity of the assistance of basically tried and proved standard

codes of practice. It has been said that some of these codes of practice as issued are very elementary, but it is many of the codes of practice in the industry which have been sadly neglected in the past. In many cases to obviate the chance of the lack of basic technical knowledge coupled with the opportunities afforded by the nationalised industry for further self-education, should, in the very near future, begin to have quite considerable effect on the efficiency of our establishments. Mr. E. H. Winch, in his paper, 'Some Thoughts on Education in the Gas Industry,' asked 'Is it too much to hope that the area boards would initiate some form of corporate residential course covering both theoretical and practical aspects?' From what I know of new schemes operating and projected by area boards, the necessity for practical as well as theoretical education is very much appreciated, and opportunities for practical training on the works will be provided.

There are many other points on this subject of staff training which can be raised, another being the question of the cultivation of powers of observation. So often on a gasworks things go wrong which should never have been allowed to happen. It seems to me that if the technical staff cultivate powers of observation to observe likely sources of future trouble and also a strength of will-power and take the necessary action without delay, then I am sure that many of our troubles will disappear. In a way, this power of observation is detection, and its use and the employment of skilled methods of restoration is a criterion of technical ability. Some might say that this ability comes with experience and this is, in part, quite true, but there is this point, however—that any young technician sound in basic knowledge and training can by energy and observation be as useful a member of a technical staff as men with the advantage of years of experience.

Cleanliness

This is the last item I wish to raise, but it is by no means the least important. The psychological effect of a clean and tidy works has been discussed many times before and its undoubted effect on moral, and on efficiency, is never questioned. In spite of this, however, you can still go round gasworks and find the most awkward and unlikely items stacked and left in the most unexpected and inconvenient places. I suggest that if owing to labour difficulty, which is the usual excuse, you find that you are not always able to keep your roads and establishments clean, then it will undoubtedly help you if you endeavour to get some sort of system about this matter. I have found myself that a gasworks can be kept clean with far less staff than normal by sectionalising and religiously cleaning these sections in turn. If you have adequate staff for this work, it will still pay you to sectionalise for scouring purposes and when you scour be ruthless about it and insist that retort houses and places of manufacture are allowed to contain only the tools for the job.

I wish to take this opportunity of thanking the Eastern Gas Board and the Divisional General Manager (Cambridge Division) for permission to make references to the Cambridge undertaking. I also wish to thank Mr. H. F. H. Jones, Chairman of the East Midlands Gas Board, for permission to present this paper, and for facilities granted in connection with its preparation.

DISCUSSION

Opening the discussion, the President, **Mr. G. Davies** (Great Grimsby) commented that Mr. Jarrett seemed to be trying to sell them something. Speaking as a distribution man, he was sorry that the author could not have applied some of his theories to the sales and service department of an undertaking, or at any rate touched on some of the problems—such as sulphur—normally encountered by district men. This paper advocating neatness and systematic planning on the works struck him as somewhat ironical, since in his experience, it was works fitters who were outstandingly untidy over such things as stores systems, etc.

Mr. A. Collinson (Peterborough) said he would be interested to know a little more about the costing system advocated. Costing was necessary in the distribution department but was not usually practised in the same way on the works. He wondered how the repairs were established and costed; was any of this work farmed out?

In reply, **Mr. Jarrett** said that the work had to be done by one's own men. There were several costing systems in operation, such as that employed at Tottenham, which was itself an offshoot of an earlier system operated at Croydon. One had to depend on the return of the men's time sheets and, of course, materials had to be coded off from the stores. It was necessary to remark, however, that it was unwise to rely too much on a costing system; it was an invaluable help, but it was neither foolproof nor utterly conclusive.

Mr. H. D. Sullivan (Worksop) felt that, in a maintenance system, some items were self-evident. For example, was it Mr. Jarrett's policy completely to overhaul such items as generators, etc.? Some things required more detailed consideration; they might be safely left for years without overhaul. Take an exhauster or a steam engine, for example. It was a comparatively simple matter to check the glands and make sure there was no knock, etc. But would Mr. Jarrett advocate dismantling such plant, a procedure which would probably be quite unnecessary?

Replying, **Mr. Jarrett** explained that with exhausters or compressors it was well worth while to take the end plates off and get a fitter to check the clearances and tolerances. It might happen that a fitter was not available at the appropriate time, and in such a case, the matter should be carried forward. In any case, it was acknowledged that an exhauster needed little overhaul. It was easy to raise points of this nature—the essence of the system was that it should serve as a guide, and not be adhered to in every detail. The important thing was to obviate the danger of completely overlooking such matters. If a check-up of this nature was carried forward each time, the engineer had some means of knowing that the inspection of a particular piece of plant was overdue. Suppose a steam engine went up for overhaul and was looked at and checked. It might subsequently be left for 12 months, but the engineer had the satisfaction of knowing either that it could be relied upon for a considerable period of time, or, if certain parts showed signs of wear, orders could be put through for replacements. When these parts finally gave out, there need be no time lost in replacing them.

Maintenance Personnel

Mr. Marshall (Bedford) wondered how the author suggested that the correct number of skilled maintenance personnel might be established.

Replying, **Mr. Jarrett** said that, in the first place, they should start with the original staff and see how things went. As far as fitters were concerned, he had found it desirable to have two or three fitters per mill. cu.ft. per day. And in this respect, it might be added that the use of more than one fitter for one job was a waste of manpower. The answer was to give him a mate or mates, and use one fitter for each job. The ratio which he had found satisfactory for other employees was as follows (in each case for 1 mill. per day works): Bricklayers, half a man; cleaners, one man; painters, one man; general labourers, two or three men. It was also necessary to have special labourers on the works for such plant as water softeners, syphons, etc., and these would probably be required at the ratio of two men per mill. per day.

Mr. T. A. Bland (Peterborough) commented on the author's suggested adoption of makers' original guarantee figures. These figures were generally conservative, and in most cases it was possible to improve on them. For example, if the makers reckoned a life of eight years, by assuming a life of four or five years, a higher efficiency could usually be obtained. He wondered if the author could suggest a criterion. With steam engines, if an efficiency figure of 30% could be obtained, one must consider oneself lucky. The answer was to employ electric motors and recover the waste heat from the exhausters, employing turbo-alternators.

In reply, **Mr. Jarrett** remarked that when operating settings, it should be possible to get guarantee figures. If, however, one was prepared to pace the plant, it might be finished in four or five years. The area engineer might have his own ideas on how long the plant should last, and might be prepared to push the throughput up at the expense of the plant's life. If, however, the area engineer stated that the plant must last eight years and still wanted to increase the throughput, then if the plant came to grief, the works engineer

W-D

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HEREFORD *(Third Installation)*	23
HUDDERSFIELD	189
MARGATE *(Third Installation)*	55
NOTTINGHAM *(Third Installation)*	141
NOTTINGHAM *(Fourth Installation)*	141
NEWTON-ON-AYR	25
NEWMARKET *(Third Installation)*	11
OLDHAM *(Third Installation)*	122
POOLE *(Seventh Installation)*	237
PAISLEY *(Third Installation)*	69
REDDITCH *(Third Installation)*	46
CHESTER *(Third Installation)*	66

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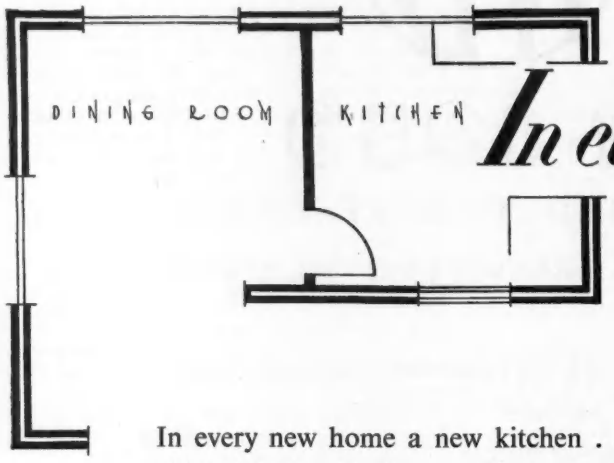

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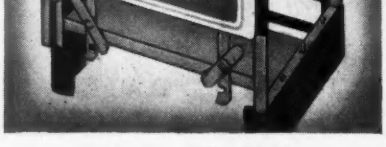

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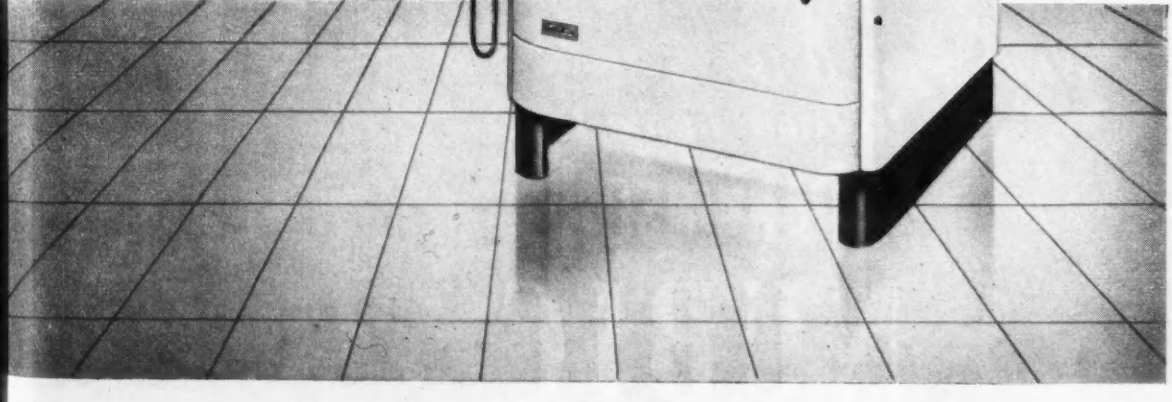

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had a sound defence. On the question of steam engines, the general consensus of opinion was that where it was possible to replace isolated steam engines by electric motors, it was desirable to do so. Of the use of turbo-alternators and paralleling with the electricity supply he preferred to say nothing, since the matter had been dealt with by such experts on the subject as Mr. Buxton, Electrical Engineer to the South Eastern Gas Board, and Mr. Rimmer.

Mr. A. W. Sanders (Spalding) commented that the effectiveness of the methods advocated were dependent on two things: (a) That the works was of a fair size; and (b) that back pressure turbines were employed. If back pressure steam was employed, it did much to get costs down.

Mr. W. J. Spiller (Cambridge) referred to the coal test figures given in the paper. The figures suggested that there was no falling off in quality during the last 18 months. If reference was made to the 1950 World Power Conference, to which much useful information was contributed by eminent experts of the North Thames Gas Board, it would appear that the quality had fallen off. He wondered whether Mr. Jarrett's figures were taken on coal received, or were they related to ash received on a tonnage basis? A delivery of 1,000 tons might yield 6% ash, and a delivery of 500 tons might yield only 4% ash; the only true basis was available therms per ton. Turbo-alternators were essential for a low pressure job, but he regarded the back-pressure turbine as a most inefficient piece of apparatus.

Mr. Jarrett replied that the figures given were fairly representative results. It was true that there were bad patches when 12-15% of ash was received, but the results given were average figures over a period. In this respect it was interesting to note that a National Coal Board official, who was an acknowledged expert on washing coal, had recently stated that in future all coals would not contain more than 12% of ash.

Meter Overhauls

Mr. J. Anderton (Great Yarmouth) enquired how often Mr. Jarrett would advocate overhauling meters, and whether he would shut down the meter entirely and employ a by-pass.

In reply, **Mr. Jarrett** said that a test for accuracy every two years was standard. However, if old-fashioned meters were employed, there was a tendency for them to spring leaks at the joints, and more frequent overhaul might be necessary. The best way was to get the makers to do the job. It was quite normal to by-pass the meter except for the small amount of gas necessary for testing, although it was debatable whether it was as easy to test properly on a low throughput. Glands should be adjusted weekly. The essential point about the maintenance system was that it should be elastic. If a man was down to do a certain job it was not necessary for him to go and do it first thing in the morning; it could be fitted in whenever circumstances made it convenient. He was now engaged in planning a maintenance system for a 40 mill. a day works, which ran to 28 sheets of items. On the other hand, a small works with only two settings with which he was familiar had a maintenance programme with only 20 items; it was amusing to note that at this particular works there was such an excess of plant that only one setting was used throughout the year. The main thing was that the works, however, small, had a programme, even though it was contained on a single sheet.

Mr. F. A. Rhead (Peterborough) remarked that he had found the suggested schedules of great interest, for this was a matter which exercised much of the management's attention at the present time. He wondered whether this had been planned by the management side. If not, at what level had it been planned? What link-up had been effected between the maintenance men and the management?

Mr. Jarrett replied that at Cambridge, on which most of his experience had been gained, they had had monthly meetings. Prior to these meetings the engineer and the man in charge of the shops worked out what had to be done, and then the leading technicians on the works, including the shift superintendent, the mechanical foreman, and perhaps the chief foreman or yard foreman, were brought in. First they would go through the previous month's minutes and decide which items should be carried forward, and then they would decide what new items should be added to the list. Theoretically, if they had a foolproof system, there would never be a breakdown. This was somewhat optimistic, but at least a lot of possible breakdowns would be avoided. Everyone with responsibility on the works would know what the programme was for the next month, and everyone had a chance to call attention to important jobs and get them included in the programme. One thing must be remembered, however—this programme must never be pinned up in the shop, otherwise every fitter would be able to say, 'I can't do so-and-so now, the governor put me on this.'

Mr. A. D. Duxbury (Peterborough) emphasised the importance of the subject covered by Mr. Jarrett's paper, and said he intended to comment on one or two of its wider aspects. In the first place, he would like to endorse the author's remarks concerning water gas plants, with particular reference to clinkering. It was possible to work a water gas plant to get an extra 100,000 out of it, but such a procedure showed a loss in the long run. Mr. Jarrett's suggestions had great importance when estimating for future supplies of coal and coke. They were expected to put in estimates for 12 or 18 months ahead, but these estimates would be based on the assumption that the plant would be working for the whole of that time; if the plant's operation was upset, the estimate figures would obviously be thrown out. Therefore anything which contributed to the accuracy of these estimates would be welcome. He also supported Mr. Jarrett's comments on coal quality. He had been fortunate in hearing a paper presented to the Yorkshire Juniors in 1948 on the results obtained in a coal test plant; this had revealed that the standard of coal received had deteriorated only slightly. He had heard claims of a 20% deterioration, but they were not necessarily true. He also supported Mr. Jarrett's remarks concerning the proper use of junior technical staff in the retort house. He knew of a vertical retort house which had been operated by a shift engineer and no one else. It was decided to put in a senior engineer and a good junior. In a very short space of time increased output had more than paid their salaries and showed a reasonable profit.

A vote of thanks to the author was proposed by **Mr. K. E. Chambers** (Peterborough) and seconded by **Mr. Duxbury.**

DURABILITY OF BUILDINGS

The Council for Codes of Practice for Buildings has now issued in final form Chapter IX, 'Durability,' of the Code of Functional Requirements of Buildings. This chapter was previously issued as a draft for comment, and has now been revised, in the light of comments received, by the Council's Technical Consultative Group. The chapter contains brief notes on the designed life, satisfactory life, and maintenance requirements of buildings or parts of buildings. Six appendices giving useful general information are included.

In these appendices the particular causes of deterioration of buildings and installations are analysed, and appropriate protective and preservative treatments are recommended. Information is given on the susceptibility of building materials to deterioration, in particular of metals, timber, cement products, stones, clay bricks and tiles, bituminous materials, and paints. Other matters dealt with in the appendices are the effect of design upon the durability of materials, the classification of water supplies in relation to their effect upon metals, of ground water and soil in relation to thir effect upon concrete, and of atmospheric pollution conditions.

The chapter includes tables giving approximate rates of corrosion of steel and of zinc coatings on steel, recommended protective measures for metals, and a classification of sulphate soil conditions affecting concrete, with recommended precautionary measures.

Copies of the chapter may be obtained from the British Standards Institution, 24, Victoria Street, London, S.W.1, price 4s., post free, Reference CP 3—Chapter IX.

New B.R.T.A. Booklet

The British Road Tar Association has prepared a booklet in order that road tar suppliers, surveyors and other users of road tar might have, in readily accessible form, a summary of the relevant British Standard Specifications and other publications. Surveyors particularly will find it useful when they are dealing with their tenders.

DISTRIBUTION OF GAS IN A MINING AREA

By F. C. HAWKYARD,

Cannock District, West Midlands Gas Board.

This paper, given to the Midland Junior Gas Association, deals with subsidence how it affects distribution, and the methods employed in countering it.

CANNOCK does not claim to be the only district affected by mining subsidence. Several other districts in various parts of the country experience damage in varying degrees, some probably worse, and much more serious in larger towns where bigger mains are laid in congested areas. The depth at which the coal is being mined plays an important part in the disturbance of the ground above resulting in subsidence. A great deal depends on the formation of the earth surface. If the intervening strata is of rocky formation, subsidence is doubtful and may never happen. If, as in the Chase mining area, it consists of marle, gravels, and possibly a thin bed of sandstone, subsidence will appear and continue for some years after the coal has been removed.

Cannock is practically in the centre of the Chase mining area with approximately 24 collieries scattered all around it. The town of Cannock is at present free from damage. This we hope will continue. Less than half a mile from the centre of the town, we have experienced damage to mains and services.

The approach to Cannock from practically every direction is marred by unsightly dirt mounds, roads with an unpleasant uneven surface, with ripples and cracks running in all directions, kerbs pushed out of line and raised several inches above the normal level, and warning notices that the road is liable to subsidence. Often you might think the roads are neglected and the road authorities are not doing their job. On the contrary; they have a tremendous job to keep them in order.

Every service buried in the road, whether it is water, gas, electric, sewer, or telephone cable, is liable to damage. The houses bordering the road lean drunkenly forwards, and others backwards, doors and windows become fixed, and ceilings crack and fall down. Some houses become uninhabitable and eventually collapse. Excellent farming land may subside and instead of a crop of corn or roots you have a pool of water. This is an indication of what is happening all around us continuously.

Dirt Mounds

The little hills or mounds that look like pyramids previously mentioned are the continued accumulation of dirt removed from pit workings. When you add this to the amount of coal that is raised to the surface each year, it will give you some idea of the cavity formed down below. A part of this cavity will remain as roadways, giving access to the coal face, but the remaining portion will be allowed to collapse. The settlement eventually affects the surface, causing subsidence and damage.

Cannock has approximately 126 miles of mains ranging from 2 in. to 16 in. In that length there are 20 miles of high pressure mains varying in pressure from 2 lb. to 11 lb. per sq. in. Nearly all these high pressure mains pass through areas affected by mining subsidence. Of the total length of mains, something like 80% is laid in a mining area. This gives some idea of the risks we run daily. Some of these districts may be dormant, but the opening up of another seam may restart subsidence. There may be an interval of a few years between one period of activity and the next. This is governed by the length of time it takes to complete one seam of coal and commence the next. (This next seam may be much nearer to the earth's surface and by reason of the more rapid and uneven movement will cause more damage.)

To minimise leakage, pressures are carefully controlled to give the best service to the consumer and at the same time to avoid carrying excess pressure. This has always been the policy of the chief engineer, and the ultimate aim is a pressure of $35/10 \pm 5/10$ in. This has been largely accomplished by the use of feeder mains maintained at 1-5 lb. pressure with high to low district governors coming into operation at pressures below 31/10 in. To avoid excessive peak loads on the high pressure system the low pressure mains are gradually being added to and enlarged. We believe that a pressure of 35/10 in. is a desirable maximum for the low pressure system in a district such as this.

The loss of gas through leakage, and the cost of repairs and renewal of mains, has been a constant drain on this small undertaking for many years. Something like £5,000 a year is lost in leakage, repair, and reinstatement (occasionally we have to pay for damage or replace plants and hedges in front gardens killed by gas).

The Search for Leakage

The search for leakage entails, in addition to systematic barring and isolation of sections for test, the excavation of several holes and breaking up of roads. This means heavy reinstatement costs. There is no guarantee that in the first hole excavated you find the leak. Cavities, cracks, and sewers may easily carry the gas away from the actual break. The battle against this undesirable consumer has continued for something like 50 years, and continuous vigilance has reduced the percentage of unaccounted-for gas from 25% to about 12%, although the actual quantity lost is about the same.

Now that coal has become priority No. 1, seams are being mined at shallower depths, some as little as 70 yds. from the surface. There we can expect trouble, and this may appear soon after coal has been extracted and not always directly over the position, it may be anything up to 45° from the working, depending on the formation of the ground above. Some mining of coal in this area is approximately 600 yds. deep, and may only slightly affect us.

Up to the present this undertaking has never received any compensation for damage sustained to any part of the distribution system or for the loss of gas through leakage.

Following the recommendations of the Turner Committee there is some hope that in the future the position may be rectified, but one of the main benefits of the report will be in the close collaboration between the boards to provide information on future workings.

In the fight against damage, having information on the location, extent and duration of subsidence is invaluable. The table on the following page is a record covering the five years from 1945 to 1949 of leakage attended to and repaired together with the cost of repairs and the loss of gas for each year.

We have always obtained what information we could and where possible anticipated damage by making allowance for additional compression or movement that might fracture services. Exchanging of information with the local water works officials has helped considerably. They are affected just as much as we are, except that when a large water main bursts the potential damage, apart from explosion risks, is much more, due to the water pressure involved. You can realise the seriousness of two mains being fairly close together, when damage occurs to both. Instead of an escape of gas, water may be entering through the break, and eventually flooding the main. This has happened and cut off the supply

of gas. To keep gas flowing through this main, the syphon had to be cleared every two hours until the leak was found and repaired.

That same syphon and several others, are visited twice a week whatever happens, any excess of water is followed up immediately and the area tested, sometimes by drilling a hole in the main to see if water is flowing on the bottom.

A record of all incidents, fractures, etc., is plotted on a 6 in. to the mile Ordnance, coloured pins being used to represent the damage sustained. When a year is completed, this is photographed and serves as a record for future information. It can be seen at a glance which are the areas affected and the map can be read to forecast the direction and particular position in which we can expect future damage.

CANNOCK DISTRICT.

Record of Damage and Costs Due to Mining Subsidence.

Year	1945.	1946.	1947.	1948.	1949.
Broken mains	27	17	28	22	43
Broken Services	62	44	76	81	69
Drawn joints	78	67	63	73	101
Cost of repairs	£408	£293	£426	£527	£596
Cost of mains Renewals	£1,029	£29	*nil*	*nil*	£82
Lifting and Re-levelling of mains	*nil*	£363	*nil*	*nil*	*nil*
Unaccounted for gas—					
Thous. cu. ft.	36,880	38,877	39,880	44,988	55,492
Therms	175,182	184,666	189,430	213,697	263,590
% of make	12.16%	11.92%	10.77%	11.34%	12.01%
Value of gas lost in excess of 5% of make calculated at net into holder	£3,008	£3,127	£2,706	£3,689	£4,336

Costs of reinstatement not included.

Precautions and Methods Employed

Mains.

New mains are either steel with welded joints and flexible couplings, fixed at frequent intervals, or cast iron with flexible joints and collars or couplings in predetermined positions to allow for expansion or contraction. Steel has been largely used in the past when the area was known to be affected by mining subsidence, as it will stand up to an enormous amount of compression and tension. Careful planning of the position, depth, and the position of long-sleeved joints will help to minimise the possible effect of damage. Some idea of what can happen to a steel main will be dealt with later. When a cast main is under constant repair and it is known that the colliery will be extracting coal from that area for an indefinite period, this main is replaced with steel and if possible laid in the path with a minimum of cover to facilitate future examination and repairs.

Flexible Couplings.

The type of joint used is of the Johnson or Dresser design, in the form of a coupling or collar where a rubber gasket is compressed in contact with the outer wall of the pipe and the inner wall of the coupling, forming a sound joint capable of withstanding considerable pressure. Several designs are now available, all performing a perfect duty. Flexibility, simplicity in design, together with the ease in which they can be fitted with the least number of tools are the desired advantages of the coupling used.

Couplings or collars are used to connect two plain ends together. The distance between those ends will depend on whether compression or tension is taking place. In the case of compression the gap may be as much as 3 in., with practically no gap in the case of tension.

Drawn joints, whether steel or cast iron, are clamped with a special type of joint, unless they are too far drawn out of the socket.

Dresser Joint Clamps.

This joint is designed to repair permanently spigot and socket joints that have previously been made by lead or cement and are leaking due to movement caused by subsidence. After having remade the joint by caulking back the lead or clearing the cement flush with the face of the socket, cleaning all around the back and front of the socket and providing a smooth surface for the gasket to fit against, the anchor ring is fitted to the back of the socket. The rubber gasket is then cut at approximately 30° from the flat so that the two ends overlap, forming a perfect fitting ring on the pipe. The follower is now fitted to hold the gasket in position, and being bolted to the anchor it is compressed to the face of the joint. The joint, when properly made, will allow a considerable amount of movement and remain gas-tight. A large number of these joints have been fitted during the past 12 years with complete satisfaction.

Should the socket be split or the spigot end withdrawn, it will be necessary to cut this piece out and fit a short length of main in its place by fixing a flexible coupling at each end and allowing for whatever movement is taking place.

Services.

Several methods are employed to allow the free movement of the service within certain limits. The service may be broken off at the main in several different ways or as it enters a building. Service couplings are generally used. They are designed to give the same effect as the larger ones and constructed on the same lines, except that the ends are screwed on to the middle ring to give the necessary pressure to the armoured gasket—armoured because of the rotary motion in tightening and to prevent the distortion of the gasket.

We commenced using a lead connection about 10 years ago. This was made of lead pipe 10 lb. to the yard and in the form of an S with unions fitted at each end. The length overall was approximately 3 ft. with wiped joints making the connection between lead and brass. Protection was provided above and below by using old enamel cooker linings and wooden blocks to keep them the distance apart to allow free movement. Several are still in use and answer the purpose if the movement is not excessive. Where leakage again occurred after one has been fitted it has been found that the lead had broken immediately behind the wiped joint. Ten in one street were broken this way.

Use of Rubber Hose

We are now using a rubber hose synthetically lined to resist the absorption of hydrocarbons and have found it very successful. We do not accept this as a permanent repair, but if it will remain in perfect order for four to six years it may be long enough to see us through the period when subsidence is severe. It can then be either renewed or fitted with a service coupling. This is used in short lengths about 15 in. to 18 in., 1¼ in. internal diameter, to fit over a 1 in. service pipe and the fitting on the main. Each end is then fastened with jubilee clips. We use old cooker linings to protect this connection above and below and find they answer the purpose perfectly without cost. Some of these connections have been in use for two years and have never given any trouble though we know that movement still exists in that area. To date no other material we know will stand the amount of compression and tension it may be subjected to. The only doubt which exists is how long it can lie in damp ground, but we have been assured by the makers that it will stand up to such conditions for several years.

At the house or building end, we get the same trouble but with greater danger to the occupier. This has been solved by the use of annealed copper tube, making all the necessary bend from one piece. The length of copper tube replaces something like 15 ft. of the present service, the main cock and connection to service being made with 'Coneor' joints. The space through which the service pipe enters the house is well packed with 'Denso' around the service, filling the hole to prevent gas infiltrating in the case of damage to the service.

Numerous service pipes have been broken off as they enter a house either through the wall or through the floor. The use of annealed copper will allow for considerable movement in any direction and give flexibility under severe conditions.

All members of the distribution staff are encouraged to

report any sign of subsidence that may contribute to leakage. Cracks in the road, kerbs lifting, damage to houses, distorted iron fences, shrivelling of hedges and grass—all are indications of a possible leakage. Most of the inhabitants of an area affected by mining subsidence are conscious of what is going on around them and know the danger of leaking gas. Our most important duty is to prevent gas leaking into houses and property. Any report, whatever the time, is investigated. Sometimes it may be nothing at all, but we do not take chances. Examination of the area is continued until we have proved there is or is not a leak. All known areas are examined every week, and if activity is taking place this district is systematically tested with bar and Short's leakage indicator.

If reports of leakage are not coming in, then we go out to look for it. The point of leakage does not always show itself and it may be necessary to test various sections of main before locating the leakage.

Each trailer tool cart is fitted with an 'Antipoys' long distance breathing hose, so that if there is any danger of the main or service layer having to work in gas he can with safety. There is also a 'Sparklet' resuscitator in case of accidents and each man has had first aid training in the operation of resuscitation. Two men are on stand-by duty after normal working hours and can be called out within a few minutes. Two vehicles are equipped for towing a trailer cart and are conveniently garaged. One most important item in the equipment is 'Denso.' Broken mains and bad leakages are temporarily repaired with 'Denso' until a permanent repair can be carried out.

Testing

The system of testing mains for leakage with meter will indicate the exact amount of leakage on the section of main under test and give the mainlayer some idea of the amount to look for when testing with bar and leakage indicator.

A district is decided upon and each street, or part of the street, is tested in sections according to the length of the main and the number of services taken off. This work should usually be attempted during the spring and summer months when the days are longer and the weather more reliable. A gang of three men should be sufficient to make efficient tests where the necessary holes are already drilled. In some cases four men may be advantageous.

The street to be tested may be fed from both ends and will entail excavations at each end for bagging-off and passing gas through a meter into the main.

The length of the main under test may be 100 to 200 yds. and this may be increased progressively if the first sections are found to be sound, so that the same holes at one end for bagging-off and connecting the meter could be used.

A test meter with a large dial and a capacity of 100 cu.ft. is necessary, fitted with two rubber tube connections of about 5 ft. in length and 1 in. bore. Three holes are drilled in the main, two to be connected to the meter and the centre one to take the bags. The bags are inserted in each direction from this hole after the inside of the main has been cleaned. Water is poured between the bags. Any leakage passing either bag will be indicated by bubbles through the water. It is essential that the bagging-off is sound.

Two standpipes, with main cocks, are screwed into the main on each side of the meter—one as outlet and the other to feed the main to be tested (these need not be more than 1 ft. in length). On the outlet side two tees are fitted with tube cocks, one to fit a pressure gauge and the other to be used to exhaust the main and find out if pressure builds up before the gas is fed through the meter.

The end of this main will also require bagging-off. While these preparations are being carried out one man should be turning off all main cocks in this section.

When all is ready 5 or 10 min. tests should be taken as soon as the meter has settled down. Three or four tests may be necessary to get an accurate indication of the leakage.

If leakage is confirmed it will be necessary to test the whole length by driving a 1 in. bar over the top of the main, but a little to the side to within 1 or 2 in. at intervals of about 9 ft. carefully withdrawing the bar so that the hole remains clear and fitting a Short's leakage indicator over this hole. This may have to be repeated until the best results are obtained, making holes at shorter distances. The same will apply to each service, care being taken to avoid water pipes and electric cables. Experience is necessary in the use of the bar; knowing just where the main lies and the depth is an asset.

We have used the meter test during winter when we have had difficulty in finding a leak and have also reduced the length to 20 or 30 yds. to get it down to the smallest area. Drains and cavities sometimes make it difficult to decide where to open the road.

Main from Cannock to Brownhills

In my opinion this 6 in. main is an excellent example of a steel main laid in a mining area, showing its defects and advantages. This steel main was laid in 1932 to feed into the holder at Brownhills and then to the districts of Brownhills and Walsall Wood through the station governor. It is six miles long, three miles of which is laid in Watling Street (A.5). All is in the grass verge and not more than 18 in. deep.

All this would seem simple to a stranger, but as it was known that it was an area seriously affected by mining subsidence, careful planning was necessary in deciding on the position of long-sleeved joints to allow for movement and to minimise damage. About 12 of these sleeves were fitted 2 ft. 6 in. long with lead joints, the remainder of the main being welded. Valves were included at regular intervals so that if damage did occur sections could be isolated during repairs. The first serious damage came in the form of leakage around a syphon. When examined it was found that the two arms had been compressed so that they nearly met inside the syphon, buckling the sides as if they had been made of cardboard. The welded joints were leaking, part of the weld being torn away.

Since that time two others have met with similar treatment. Leaks have developed on the sleeve joints due to the movement of the lead. Now each end of each sleeve is fitted with a clamp giving flexibility. Two valves have been smashed to pieces and when replaced have been fitted with a coupling on each side giving much more freedom and allowing for compression or tension.

Anchors

Any lateral connections, such as services or branches taken off a main where mining subsidence is taking place, only act as anchors and restrict the movement. Where tension is applied the spigot end of a main may be drawn out of the coupling or collar. One Sunday in September, 1950, this actually happened, and at a time when 11 lb. per sq. in. pressure was on this main, and just as the peak load was coming on. This main, by the way, was feeding the Brownhills and Walsall Wood district through various governors, the only holder at this station being under repair—it was practically a renewal. This main could not be shut down, and had to be repaired with gas blowing dirt out of the hole as soon as the top layer of turf was removed. The joint was exposed carefully, revealing the end of the main just flush with the coupling. The bolts were released to slacken the coupling, which was gently driven back 3 in. on to the steel main, then bolted up again. This job was completed by two men using the long distance Antipoys breathing hose without the slightest ill effects, all within two hours and in the pouring rain. When it is convenient we shall cut a short piece out of this main and replace it with one a few inches longer. The tension on this section has probably accounted for 4 in. to 6 in. of movement from this connection in the past four years.

When you consider the length exposed to subsidence, which is nearly three miles and the number of incidents, probably 40 including broken services in a period of 18 years, this main has performed a remarkable service. In contrast, the

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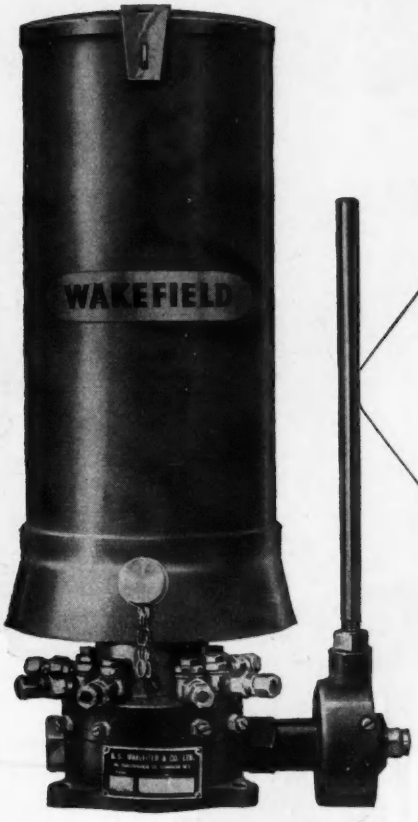

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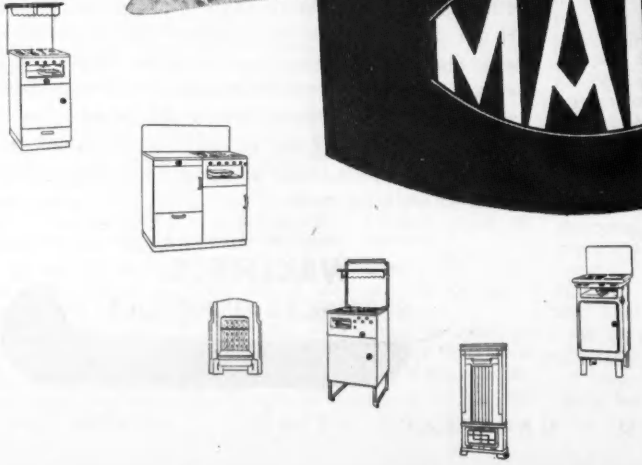

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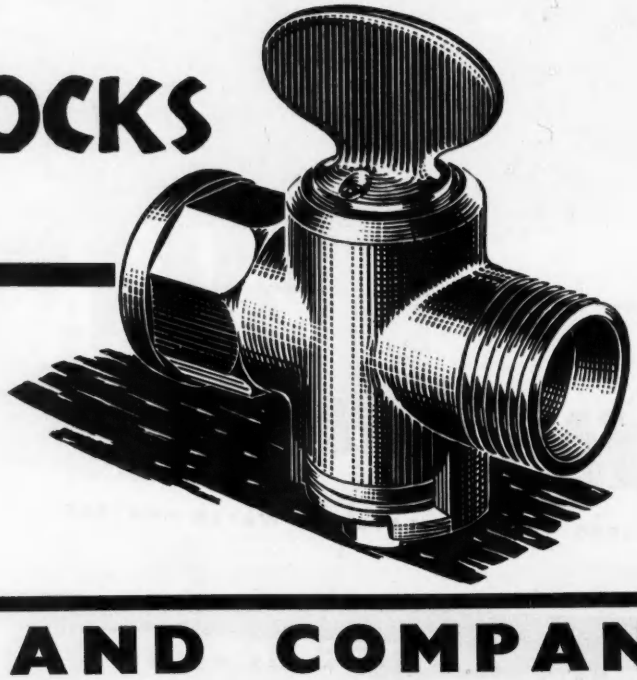

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following is the history of an area less than half a square mile and mains less than a mile in length covering the year 1950.

East Cannock District

This comprises three roads forming a triangle in which we have four mains—an 8 in. on the north-west side, a 6 in. on the east and a 5 in. on the south. All these were cast iron mains at the beginning of the year except one which is mild steel. Starting in February, 1950, we had one broken 5 in. main in Lower Road. This was nothing unusual, as we expect one or two a year here, but by June the total reached eighty-five in one week. This was serious as enquiries had already been made about the mining in this area and I had been told we should not be affected. We found out later that a seam which was running parallel to this road 80 yds. away, and 240 yds. deep was being mined.

The movement was the result of a side-slip causing pressure at right-angles to the main. Where the service was connected to the main a piece was either being pushed out from one side of the road or pulled out from the other. During this year we have had 13 broken mains in the Lower Road, four broken services, and one drawn joint. It was decided to replace this main in the area affected with 110 yds. of 6 in. steel and to fit long couplings at intervals of about 21 yds., three lengths being welded together, each service being connected to the main with a Johnson coupling.

At East Cannock Lane we have an 8 in. cast trunk main feeding Hednesford holder station on one side of the road, and on the other a 2 in. supplying the domestic consumers. This was laid in difficult times when money was short. The 8 in. has been broken twice, two broken services and three joints so badly distorted due to compression that they were cut out, to prevent the socket being split open. The pressure was so great that the piece, when cut, was still held fast between the two cut ends and had to be broken out gradually. When the last piece was broken away the two ends jumped forward 2 in. We repaired this with a piece of main 4 in. shorter than the space between the ends, and fitted flexible collars. Practically opposite this repair the water works had a 24 in. main break, the socket also being split open. An enormous amount of damage was caused to property and the water works, being responsible, had to put everything in order again.

In Hill Street, on the East side, we have had two broken 6 in. mains, three drawn joints, and five broken services.

The following are a few brief examples of incidents that might be of interest.

East Cannock.—Considerable sections of 8 in. C.I. trunk mains to Hednesford works abandoned owing to the ground sinking to a depth of 8 ft. This section was relaid with 8 in. steel main.

Churchill, Hednesford.—A 6 in. C.I. main relaid with 6 in. steel. This section was subject to heavy subsidence. On two occasions the carriage-way collapsed leaving a hole large enough to take a horse and cart.

Rawnsley, Hednesford.—A 6 in. welded steel main affected, causing considerable damage to a steel syphon, the latter being compressed nearly flat before a fracture took place and leakage commenced.

Lindon Road, Walsall Wood.—A 9 in. welded steel main with welded joints. On locating a leakage several of the joints were found to be distorted and fractured.

Clayhanger, Walsall Wood.—The land and houses between the railway and canal bridge have subsided about 12 ft. Fourteen houses all using gas had to be abandoned and are now demolished. The water covering the site is now level with what would have been the bedroom windows.

Stafford Street, Heath Hayes.—During one night in November, 1949, two broken mains were located. A report of the smell of gas was received at 8.30 p.m. The gang had completed necessary temporary repairs by 3.30 a.m. the following morning.

Underground Gasification

THE underground gasification of coal was referred to by Dr. H. Roxbee Cox, Chief Scientist to the Ministry of Fuel and Power, in an address at the Coal Industry Society luncheon at Grosvenor House, W.1, on January 8.

We felt, said Dr. Roxbee Cox, that the economics of underground gasification were far more likely to be attractive if we avoided the preparation of shafts and tunnels by men working underground. Our aim was, and is, to produce the gas by working from the surface. We have in fact done this in two ways. We created a simple U-shaped channel by drilling from high ground two vertical holes into a coal seam and joining them by drilling a horizontal hole from somewhere down the hillside so to speak. Then we start a small fire in the horizontal. This is frequently possible, but is not a sufficiently general method. Secondly, we have connected two vertical drillings by the application of pneumatic pressure slightly greater than the pressure exerted by the overburden. By both these methods we have established systems which supply gas on an experimental scale. By the first method we made a system which started to work on July 13, and which is still working. By the second and more exciting method we established a system which has been working for just over a month.

And now, you may be asking, why do it? Well, there is a great deal of coal in this country which is not worth mining, either because it is too dirty, or lies in seams which are too narrow, or is at too great a depth. A great deal of this coal can be used by the method of underground gasification. In other words, if underground gasification is successful technically, and attractive economically, and it is precisely the object of our experiments to find out whether it is, we shall have an additional source of fuel available to use.

The second question in your minds will be what is the quality of the gas? I can tell you that from coal which is half dirt and lying in a wet seam of only about 18 in. thickness we have obtained gas, under conditions approximating to those which would apply in commercial operation, of an average of about 75 B.Th.U. per cu.ft. Such a gas can readily be used as the fuel for a gas turbine engine generating electrical power, and it is with the vision of a plurality of vertical drillings connected to a number of gas turbines generating power that we push on with our experiments, to which the N.C.B. have recently decided to give direct help.

Now I remarked that the gas turbine would use this relatively poor gas from underground gasification. It can, in fact, be made to work on still more feeble gases, and in this connection you will be interested to know of another project on which we are engaged. We are making a gas turbine with pre-heating apparatus included in the cycle to burn these weak mixtures of methane in air which are available at all collieries. Once again the N.C.B. are collaborating in the venture, and, given good fortune, we shall see an engine working at a pit about the middle of next year. This is another attempt to exploit a source of fuel not hitherto used, and if it proves possible to do it on a wide scale, then a large proportion of the power which the collieries themselves need could come, so to speak, from their own waste.

There is no particular difficulty in making a turbine run on the gas from coal, and indeed we are building a 2,000 KW gas turbine engine which includes a high-pressure gas producer in the circuit. Coal is used in the gas producer, and the resulting gas is burned in the combustion chamber of the gas turbine. Apart from its own possibilities, this engine is of great interest in that it has stimulated the design of a gas producer working at a pressure of six atmospheres. Such a gas producer may have much wider applications than only to this engine. A scaled-down version of the gas producer is expected to run in about a month's time.

There is another kind of gas turbine engine called the closed cycle gas turbine in which the working fluid goes round and round without being exhausted and, at the appropriate point in the circuit, is heated in a boiler. We are applying coal burning to this type of gas turbine as well, and once again we may expect to see an engine working in this way before the end of this year.

100 years ago

IT would appear that at all times the colonies have been more or less particular concerning the capabilities of intending immigrants.

Excerpt from "THE SCOTSMAN" 1850

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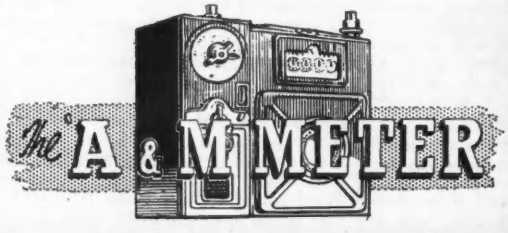

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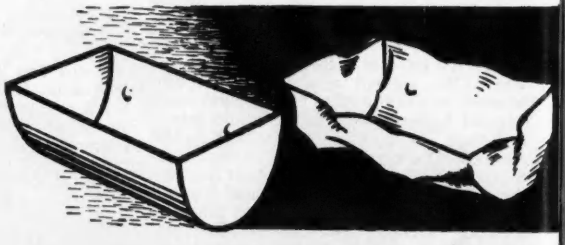

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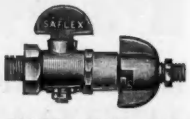

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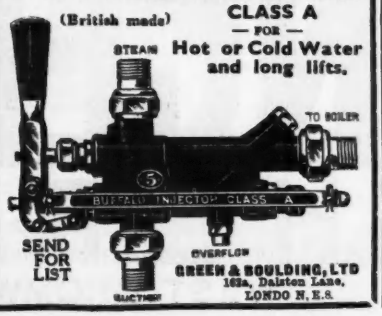

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ENGINEER, 33, M.Inst.Gas.E. (Diploma), Assoc., I.Mech.E., A.M.Inst.F., desires responsible position (preferably in Scotland). Mechanical, Chemical and Gas Engineering experience, with special reference to Gas Works and Distillation practices, High Efficiency Dust Collection (as applied to Power Stations) and Air Filtration. Experience covers Works Management, Research Work, Production Development, preparation of specifications, Estimates and Tenders and some Sales Work. Highest References. No. 9949, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

APPOINTMENTS VACANT

TECHNICAL SALES REPRESENTATIVE required with experience in Gasworks and By-Product Plant design, construction and operation. Suitable applicants should be between 30 and 45 years of age, preferably with higher grade certificate of the Institution of Gas Engineers or equivalent qualification. Membership of the Institution of Gas Engineers an advantage. The appointment is superannuable and includes the use of a company car and participation in an efficiency bonus scheme. Please write stating age, qualifications, experience and salary required to the Personnel Officer, Newton Chambers & Co., Ltd. Thorncliffe, Sheffield.

THE WOODALL-DUCKHAM COMPANY

TRAINING SCHEME FOR OPERATING ENGINEERS.

THE WOODALL-DUCKHAM COMPANY offers training facilities in gas and coke making processes, including the heating up and putting to work of Continuous Vertical Retorts, Intermittent Vertical Chambers, Coke Ovens and By-Product Plants, together with some experience in Laboratory work and Plant Construction. Permanent positions on the Outside Operating Staff will be available to suitable men at the end of the 4 to 5 years' training period.

Applicants should be between 18 and 23 years old and progressive salaries will be paid according to age, education and previous experience, if any.

Applications, with full particulars, should be sent in the first instance to: The Personnel Officer, The Woodall-Duckham Company, 63-77, Brompton Road, London, S.W.3.

NORTH EASTERN GAS BOARD

WAKEFIELD GROUP.

VACANCIES exist in the Morley District of the above Group for two Certified Grade I GAS FITTERS.

The rate of pay is governed by the National Joint Industrial Council for the Gas Industry (Provincial "A")

The tenancy of two cottages, one in Morley and one in Drighlington, will be available at rental to the successful applicants.

Applications stating age, details of training with qualifications, along with two Testimonials to be in the hands of the undersigned within 14 days of the appearance of this notification.

J. M. McLUSKY,
Group General Manager,

Warrengate,
Wakefield.
24/M/RW-DP.
January 22, 1951.

(Classified advertisements continued on Supplement 4)

APPOINTMENTS VACANT (ctd.)

SCOTTISH GAS BOARD

DUNDEE GROUP.
FORFAR DISTRICT.

APPLICATIONS are invited for the appointment of Technical Assistant. Applicants should have the Higher Grade Certificate of the Institution of Gas Engineers (Manufacture) with a sound practical knowledge of gasworks practice, carbonisation in continuous vertical retorts and supervision of labour.

The salary will be A.P.T. Grade V Provincial "B" Scale (£370-£450 per annum) and placing in the scale will be according to qualifications and experience.

The successful candidate will be required to pass a medical examination, and the appointment will be subject to the provisions of such Superannuation Scheme as may be adopted by the Board.

Applications, stating age, experience, qualifications, etc., together with *copies* of 2 recent Testimonials or names of referees, should be made to the undersigned not later than 14 days from the publication of this advertisement.

THOMAS NAPIER,
District Manager.

SCOTTISH GAS BOARD

LANARKSHIRE GROUP.
APPOINTMENT OF DISTRICT MANAGER.
HAMILTON DISTRICT.

APPLICATIONS are invited from qualified gas engineers for the position of DISTRICT MANAGER of the Hamilton District Gas Undertaking.

Applicants must be experienced in the administration and supervision of a gas undertaking, and have had sound practical experience in control of gas production plant, continuous vertical retorts, and distribution practice.

The appointment shall be within the salary range £850-£1,050 per annum.

Applicants should state whether or not the position they presently hold is superannuated and the successful candidate may require to pass a medical examination.

Applications, giving full particulars of age, qualifications and experience, together with *copies* of three recent Testimonials to be received by the undersigned not later than Monday, February 12, 1951.

FRED. R. MITCHELL,
Group Manager.

Gas Offices,
Uddingston,
Lanarkshire.
January 15, 1951.

NORTHERN GAS BOARD

(STOCKTON DIVISION)
TECHNICAL ASSISTANT (DISTRIBUTION)—
THE HARTLEPOOLS UNIT.

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT (Distribution) to the Hartlepools Unit.

The commencing salary will be £375 per annum rising to £420 per annum by annual increments of £15.

The successful candidate may be required to pass a medical examination and the appointment will be subject to such Superannuation regulations as may, in due course, be made.

Candidates should at least possess the Ordinary Grade Certificate in Gas Engineering (Supply), and have experience in domestic and industrial utilization of gas, the promotion of gas sales, and the laying of mains and services.

Applications stating age, qualifications and experience together with two recent Testimonials, should be forwarded to F. J. WEBSTER, Engineer and Manager, The Northern Gas Board (Stockton Division), The Hartlepools Unit, Middleton Road, West Hartlepool, not later than February 28, 1951.

F. L. SCAIFE,
Divisional General Manager.

EAST MIDLANDS GAS BOARD

APPOINTMENTS OF GROUP MANAGERS.

APPLICATIONS are invited from persons experienced in the administration and control of gas undertakings, for the positions of GROUP MANAGERS to take charge of the following undertakings:—

(1) Grimsby, Cleethorpes and Caistor. Commencing salary not less than £1,200 per annum. The individual appointed will be required to integrate the operations of the two former undertakings, of which he will be in direct charge.

(2) Scunthorpe, Brigg, Winterton, Barton-upon-Humber and Barrow-upon-Humber. Commencing salary not less than £900 per annum. In addition to his responsibility for the group, the individual appointed will be in direct charge of the Scunthorpe undertaking, of which he will be local manager.

Both are new appointments consequent upon the reorganisation of the Board's administration in Lincolnshire, and the candidates appointed will be responsible to the General Manager of the Lincolnshire Division for the operation of the Groups.

The appointments will be subject to the provisions of any superannuation scheme which the Board may adopt, and the successful candidates may be required to pass a medical examination.

Applications, stating age and giving full details of education, qualifications and experience, together with the names of two referees, should be addressed to the undersigned for receipt not later than February 14, 1951.

A. GWYNNE DAVIES,
Secretary,

Beverley House,
University Road,
Leicester.

SOUTH EASTERN GAS BOARD

EAST SURREY DIVISION.
MECHANICAL SUPERINTENDENT, WADDON WORKS.

APPLICATIONS are invited for the position of MECHANICAL SUPERINTENDENT, at Waddon Works, Purley Way, Croydon.

Applicants should be apprentice trained and have obtained Corporate membership of the Institution of Mechanical Engineers.

The applicants should have a sound theoretical knowledge and practical experience in the installation, operation and maintenance of steam raising and distributing plant, steam and internal combustion engines, turbines, boosters and pumps. They should also be familiar with mechanical handling and hydraulic machinery and have had extensive workshops experience in a supervisory capacity.

The salary will be not less than Grade IX of the National Salary Scales (Metropolitan Area) in respect of Administrative, Professional and Technical Staff (£550 to £650 per annum).

Applications in writing (quoting reference V10/131), giving particulars of age, training, experience, present occupation, etc., should reach the Personnel Manager, South Eastern Gas Board, Katharine Street, Croydon, not later than Saturday, February 17, 1951.

PUBLICATIONS

GAS ACCOUNT CALCULATORS
SUPPLIED either by Price per Therm or Thousand, for any specified Calorific Value, in book form, office charts, or pocket charts for Meter Inspectors, printed in clear type. Write for particulars to F. H. WAKELIN, LTD., Calculator Specialists, 354, WHEELER STREET, BIRMINGHAM.
'Phone: Northern 0989. 'Grams: Reckoners, B'ham.

WEST MIDLANDS GAS BOARD

INSURANCE OFFICER.

APPLICATIONS are invited for the post of Insurance Officer on the staff of the Board's Chief Accountant in Birmingham. The salary will be in accordance with Grade XII of the salary scales of the National Joint Council for Gas Staffs (£645 × £25–£770).

Applicants should have had considerable experience of the negotiation and management of fire, third-party, engineering and other classes of insurances. The person appointed may also be required to prepare property and plant schedules for rating and income tax purposes.

The successful applicant may be required to pass a medical examination and the appointment will be subject to any superannuation scheme which the Board may introduce.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to the Personnel and Establishment Officer, West Midlands Gas Board, Gas Offices, Edmund Street, Birmingham, 3, to reach him not later than fourteen days after the appearance of this advertisement. Applicants are requested to quote ref. T.P.3. when replying to this advertisement.

F. H. CURETON,
Secretary.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION.
CHIEF CLERK—WALSALL DISTRICT.

APPLICATIONS for the above post are invited from persons with secretarial and/or accountancy qualifications. The duties include supervision of wages, coke, stores and meter reading sections, preparation of statistics, maintenance of staff records and control of clerical staff.

The commencing salary will be within the range £595—£720 per annum, in accordance with Grade XI of the National Joint Council for Gas Staffs Scales.

The appointment will be subject to such superannuation regulations as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination.

Applications should be addressed to Mr. E. Hardiker, Divisional Manager, West Midlands Gas Board, Walsall and District Division, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than February 19, 1951. Applicants are requested to quote ref. T.P.3 when replying to this advertisement.

F. H. CURETON,
Secretary.

CONTRACTS OPEN

CREMATION FURNACES

TENDERS are invited for the provision of an additional gas operated furnace at West Road Crematorium, Newcastle upon Tyne. Further particulars may be obtained from the City Engineer, Town Hall, Newcastle-upon-Tyne.

WALES GAS BOARD

SWANSEA GROUP.
PAINTING OF GASHOLDERS.

THE Committee of the Swansea Group of Undertakings of the Wales Gas Board Invite from appropriate Contractors tenders for PAINTING OF GASHOLDERS at Gas Works within the Group also Tenders for the Supply and Delivery of the necessary Paint.

Copies of Specifications and particulars of Gasholders to be painted can be obtained from the Undersigned.

Completed tenders are to be forwarded to reach the undersigned not later than February 21, 1951.

A. PICKARD, M.Inst.Gas E.

Gas Offices,
Murray Street,
Llanelly.

PATENTS

KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent)
Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. Phone: City 6161.

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ALBION WEST BROMWICH

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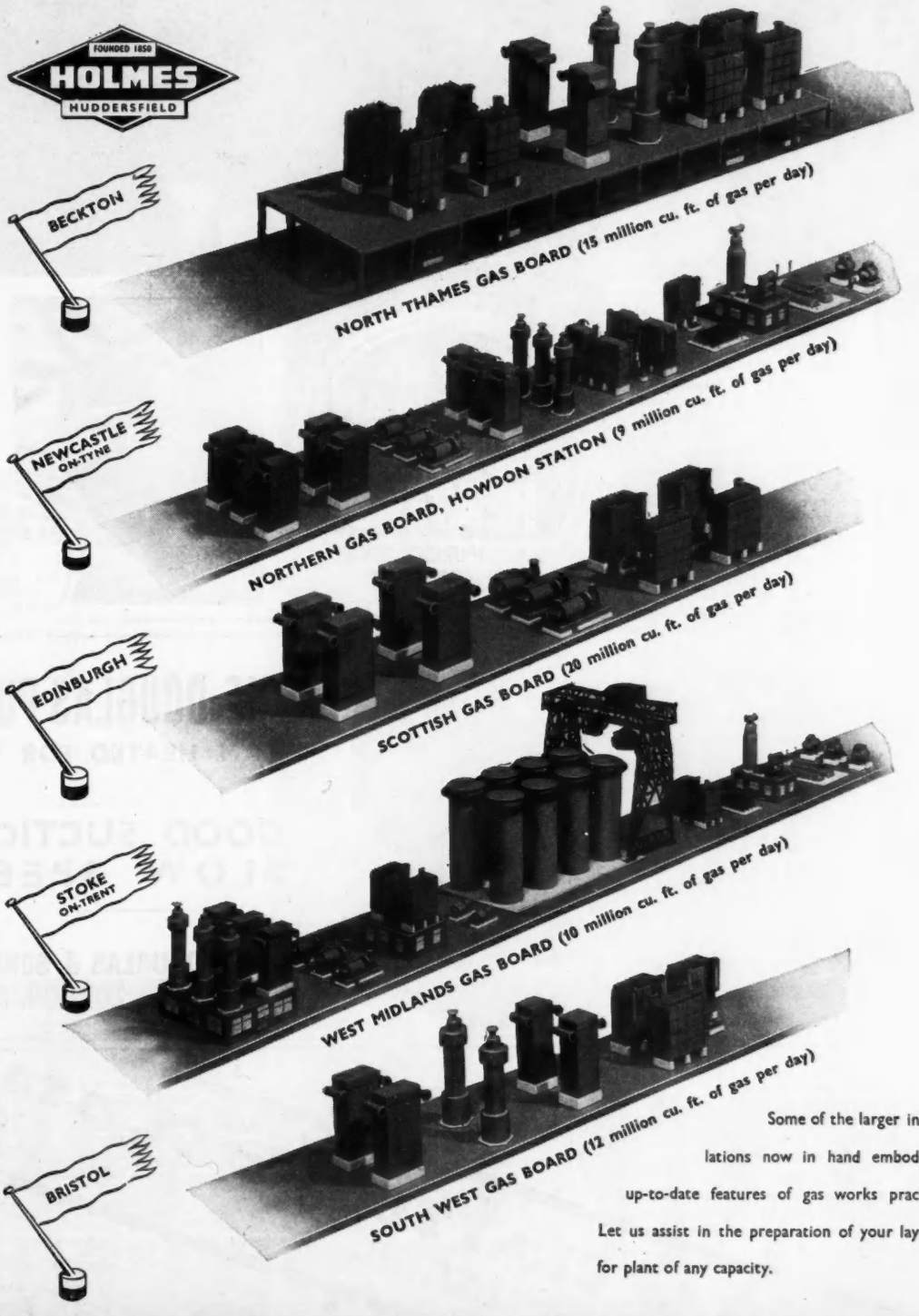
Telephone:
WEST BROMWICH 0436-7

WET AND DRY
PURIFICATION PLANT

FOUNDED 1850
HOLMES
HUDDERSFIELD


BECKTON
NORTH THAMES GAS BOARD (15 million cu. ft. of gas per day)
NEWCASTLE ON-TYNE
NORTHERN GAS BOARD, HOWDON STATION (9 million cu. ft. of gas per day)
EDINBURGH
SCOTTISH GAS BOARD (20 million cu. ft. of gas per day)
STOKE ON-TRENT
WEST MIDLANDS GAS BOARD (10 million cu. ft. of gas per day)
BRISTOL
SOUTH WEST GAS BOARD (12 million cu. ft. of gas per day)

Some of the larger installations now in hand embodying up-to-date features of gas works practice. Let us assist in the preparation of your lay-out for plant of any capacity.

W. C. HOLMES & CO. LTD · HUDDERSFIELD · LONDON · BIRMINGHAM

Telephones: Huddersfield 5280 London, Victoria 9971 Birmingham, Midland 6830

C362

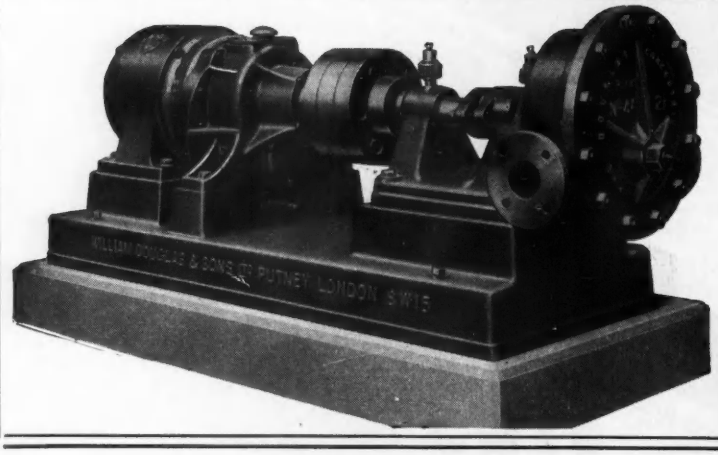
Easily and quickly installed units for warming workshops, etc.

Above : A large workshop warmed by "KB" Gas-fired Unit Heaters. Inset : Close-up of one of the units. Each unit consists of screen-protected gas burners combined with an electric circulating fan, and a louvred casing which throws the warmed air in the direction desired. The unit can be supplied without louvres, when it discharges the warmed air with a rotatory effect.

Write for full particulars and prices.

"KEITH-BLACKMAN" UNIT HEATERS
GAS-FIRED TYPE

KEITH BLACKMAN LTD.
MILL MEAD ROAD, LONDON, N.17.
'PHONE: TOTTENHAM 4522
'GRAMS: KEITHBLAC, PHONE, LONDON"



"THE DOUGLAS PUMP"
STEAM HEATED FOR TARS.

GOOD SUCTION
SLOW SPEED

WILLIAM DOUGLAS & SONS LTD.,
PUTNEY - - LONDON, S.W.15.

CONVEYORS,
ELEVATORS,
BUNKERS, ROOFS,
HOISTS, Etc.

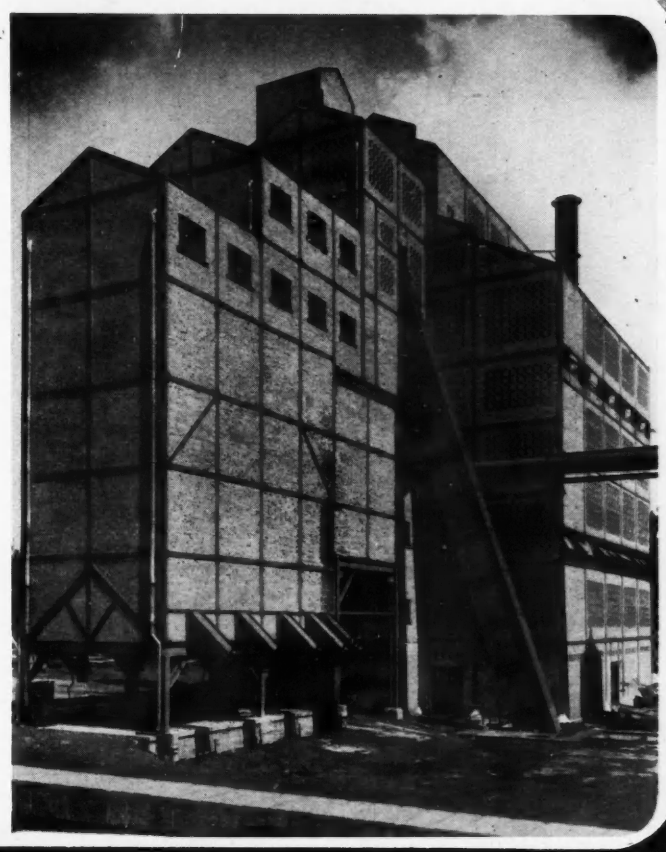
GOODALL, CLAYTON & Co. LTD.
LEEDS.

COAL AND COKE SCREENING & SIZING PLANTS.

RETORT SETTINGS
PRODUCERS. FURNACES
REPAIRS.

Printed by Straker Brothers Ltd., E.C.2, for Walter King, Limited, 11, Bolt Court, Fleet Street, London, E.C.4. Wednesday, January 31, 1951.

Work in progress



BOX HILL, VICTORIA AUSTRALIA

A view of the Coke Plant end of the new Glover-West Retort House.

West's Gas IMPROVEMENT CO., LTD.

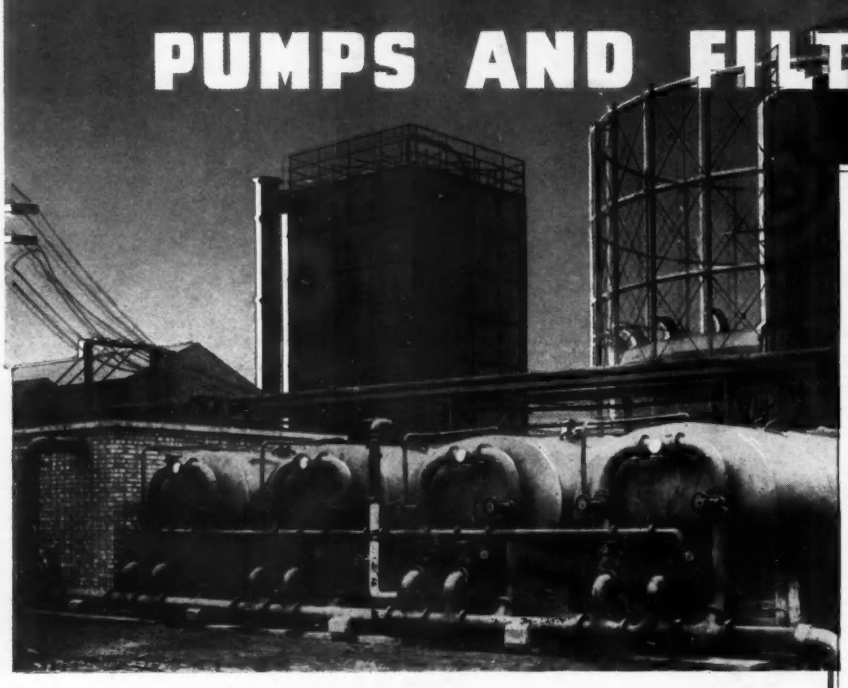
MILES PLATTING, MANCHESTER, 10

Telephone: COLlyhurst 2961-5. Telegrams: Stoker, Manchester.

... CENTRAL HOUSE, ALDWYCH, W.C.2. Telephone: HOLborn 4108-9. Telegrams: Wesgasco, Estrand.

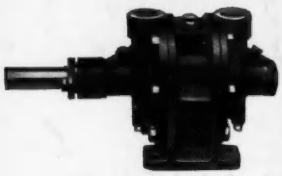
Pulsometer

PUMPS AND FILTERS

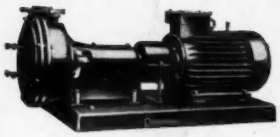


Filtration Plant in Gasworks

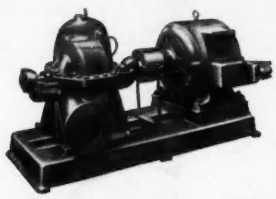
The illustrations show centrifugal pumps for light and heavy oil and liquor duties, stoneware and special metal pumps for handling acids and alkalis, pumps for circulating and washer duties, for clean water and fire services and for liquids containing abrasives.



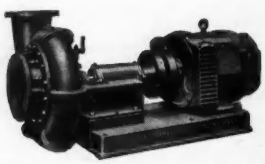
Rotary pump for Oil transfer duties.



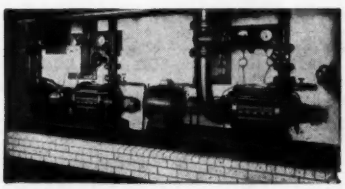
Stoneware pump for Corrosive and chemicals.



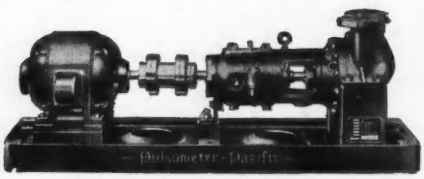
"HS" Type—for water services. All heads up to 500 feet.



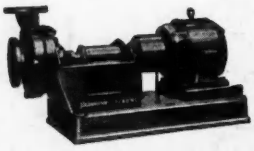
Slurry pump for coal washing and abrasive liquids.



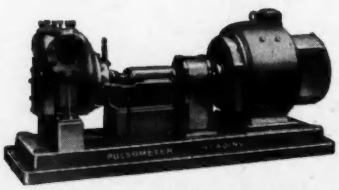
Turbine pumps for boiler feed or high pressure hydraulic services.



Pulsometer—Pacific type, based on latest American practice.



"JA" & "JB" types for high temperature water circulation.



Self priming centrifugal pumps.

PULSOMETER ENGINEERING Co. Ltd., Nine Elms Ironworks, READING